Better Crops with PLANT FOOD

The Whole Truth—Not Selected Truth

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TABLE OF CONTENTS, SEPTEMBER, 1929

White Collars 3
Jeff Defends Them

"Potato" Bill Meyers 5
E. R. Lancashire Interviews Him

English Blue Grass 7
A New Crop, by M. D. Butler

How Potassium Affects Sweet Potatoes 8
Reprinted from New Jersey Agriculture, June, 1929

Good Celery 11
A. E. Wilkinson Tells How It Is Grown

Louisiana 14
Another Experiment Station Story, by Bentley B. Mackay

The Farmer Cuts His Costs 19
A Timely Topic, by A. P. Chew

Sugar Beets 21
The Tenth of W. H. Ebling's Series

The Useful Peanut 22
An Unusual Story, by U. V. Wilcox

Corn History 25
The Origin of Our Corn, Discussed by E. N. Bressman

Agriculture Today 26
Cooperative Extension, by Frank George

Cabell Cooperates 29
A County Story, by F. N. Darling

Lonoke County's Program 30
Includes Soil Building, by J. P. Bell

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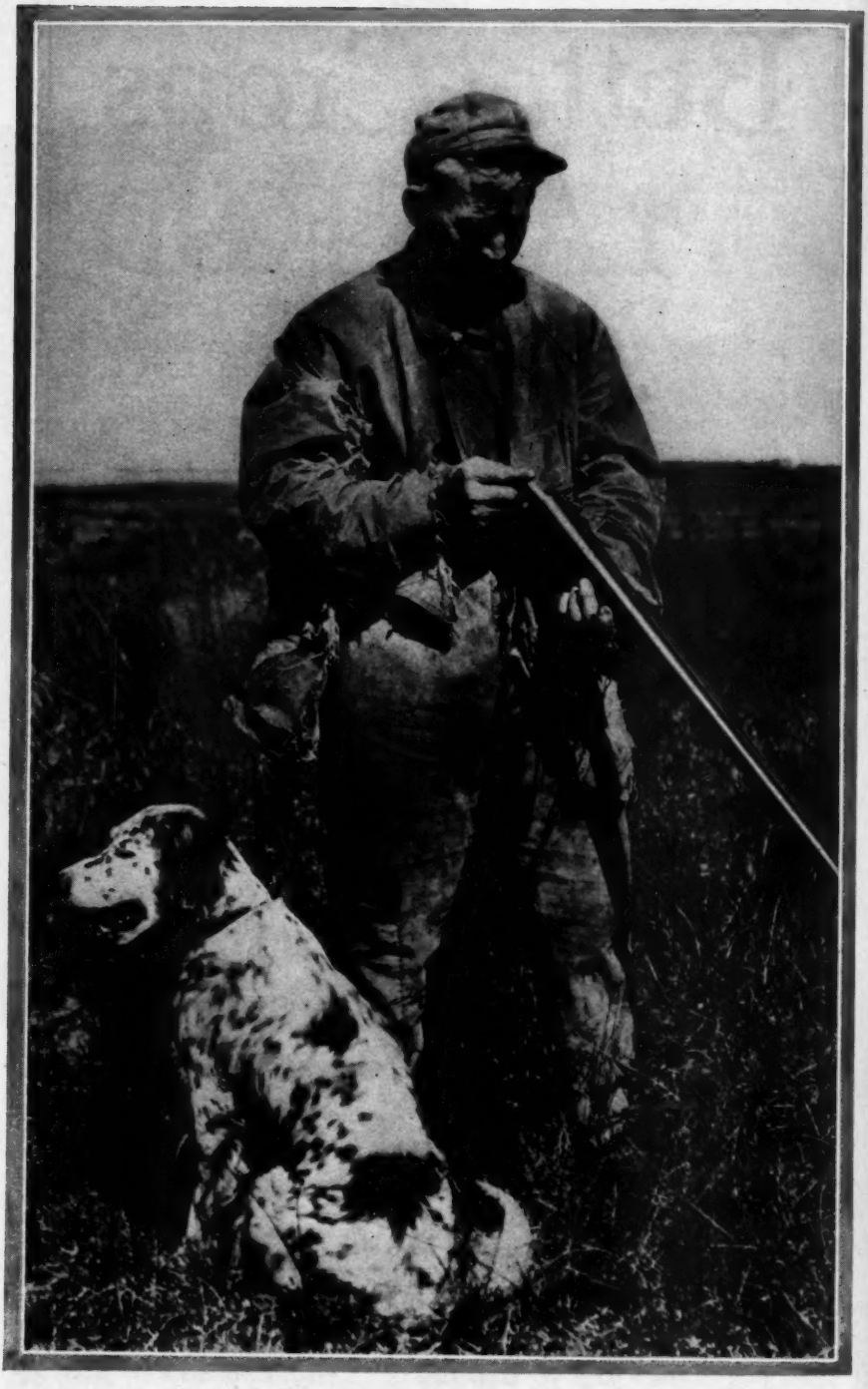

One of the "Days of Real Sport"

Better Crops with Plant Food

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In this story Jeff defends—

White Collars

By Jeff McDermid

TWO Producers had cornered the Authority On Everything. The Horny-handed Boys were trying to make the A. O. E. admit that he was a parasite because he carried a brief case instead of a tin lunch box.

Laying aside stage talk and dramatis personnae, do you think I let them bluff me so easily? Of course, I know appearances were temporarily against me. My noble countenance was fairly clean, there wasn't *much* dirt under my nails, and I had really shifted shirts oftener than once a week come Sunday. Worse and more of it, I had been reading a book of poems when they charged me with the crime of being one of the "indefensible intelligentsia"—you know, one of those who "ought to be doing some practical work" where a grunt is the sign of achievement.

I won't burden you with the old familiar debate, which is as old as the squabble between Cain and Abel—and sometimes almost as provocative of murder. No, I didn't convince them and did not hope to. They had the moral support of their labor union and the sentiment of the walking delegate, plus a little of the inborn prejudice of rural muscle against urban mind. When I left them, they sauntered into a convenient pool hall while your scribe hustled home to mow the lawn until dark and pore over office papers until midnight.

As you know, the only real difference between us was that they used the clock to quit by and I used it to

catch up with. They left their tools and their troubles on the job, while I toted mine home and kept them with me during most of my conscious hours.

My old uncle, who was both a farmer and a millwright, stuck tenaciously to the economic definitions of Adam Smith in reference to the production of the world's goods and the division of the world's workers. Many a time while I was stooping over a text-book he would sneer at me and feel my muscle, remarking that there were two great sections of society worth noting—capital and labor. He would further insinuate that it looked as though I would join neither. You, too, have had similar uncles and aunts who belonged to the old school of thought which meant either "save or shovel." If you couldn't be thrifty or pitch hay with the best of the brawny boys, it simply signified that you were a fifth wheel to the ox-cart.

BECAUSE he was an artisan and a farmer, my uncle like others similarly situated, felt that he embodied both capital and labor in one important bundle. What was there left? Only idlers and drifters. He subscribed to no trade papers for his mill, received no farm journal for his estate, and never went to a convention. Of course he never reckoned on the fact that chemists and inventors had played a part sometime somewhere in changing his millstones to attrition machinery or giving him a grain separator in place of a flail. The part that mere *ideas* and *ideals* played in his scheme of living were obscured to him in a world of toil and tolls. He arose at four o'clock in the morning and mistook mere physical activity and tangible results for the end of a "perfect day." Would that he and the hosts who scoffed at Darius Green might visit one of our airports today!

But the discouraging part of it is that in this age of wonder we still have with us those who still think the world holds but two classes of importance among producers—those who work in a bank of gold and those who labor in a bank of sand. If you adhere to that doctrine, desist from further perusal.

Just why the laundry should be called into the controversy by dubbing intellectual toilers "white collar gents" is beyond my ken. Personally, I do not connect the argument with sanitation to any extent. Furthermore, residents of Chicago or Pittsburgh end up the day's tasks with more sediment than a whole train load of milk from Wisconsin. And again, I resent the oft repeated title "dirt farmer," in which there is neither flattery nor wisdom. All these grubbing definitions seem to infer that the measure of a man's contribution to welfare lies in covering himself with more gumbo than glory. Even a pig can make pork without going near a wallow.

The rapid increase of bath tubs and safety razors in rural homes is proof positive that most of this specious argument and unworthy innuendo comes from the professional organizers. All of which plainly tells us that neither physical exertion, tangible material output, nor dirty faces possess real weight in helping Sherlock Holmes find out who are doing nothing. Nay, we must perforce seek further than muscle, materials, or soap-suds before we determine who are entitled to three square meals and a shake-down.

IF you are hired by some capitalist to do routine work and the things you make are measured or numbered, or if you sow and reap the pumpkins from the vine, it is very easy to err in believing that those who sell pure thought (schemes, plans, hopes, ideals, campaigns, and programs) are rendering no visible push to the impetus which sends us all up-hill. Yet the intellectual scene shifters who set the stage for the grand entrance of Capital and Labor are rightly entitled to

(*Turn to page* 60)

"Potato" Bill Meyers

By E. R. Lancashire

Extension Specialist, Ohio State University

BILL MEYERS might be a man of fiction, but the last time I saw him he had just completed the job of digging 11,000 bushels of White Rural late potatoes from 20 acres of muck soil near Waterloo, Indiana. Meyers was a short, little man who knew how to grow potatoes. He has the right to claim the potato grower's crown for the state of Indiana if there is such a thing.

Bill stepped off a train some 30 years back, a stranger in the region. The particular station is no longer in existence. It was located then not far from his present home. A young man then, he and his wife had just moved westward from the muck soils of northern Ohio. Seems like a short trip now, but in those days it was a long jump.

The muck swamps near Waterloo looked good to Bill. He returned to Ohio with a proposition to put up to his dad and his wife's dad. For $200 cash he could secure a 40-acre muck swamp. The balance, then as now, could be paid in easy installments. Strangely enough he put the deal over, and three years later he paid off all but a few of his current expenses. This was made possible by a certain amount of good luck and a much larger amount of hard work.

His specialties were potatoes and onions. These crops are two that require more hand labor than most men can see over. Conditions improved, and machine labor came to his aid. Last year he and his sons had out more than 100 acres of potatoes. He has established a yield record for 20-acre fields that will be hard to beat or even equal, especially in the corn belt.

To hear Bill Meyers talk potatoes is a real treat. More than 100 potato growers met on his farm for a field day. He illustrated his ideas concerning the spraying of the potato crop as follows:

Bill Meyers (left) discussing potatoes with E. R. Lancashire.

"Do you see that field of potatoes?" he asked, pointing to a nearby field.

We nodded.

"Well, it yielded 150 bushels per acre and was never sprayed. This field you are standing on was sprayed and it yielded 547 bushels per acre."

We were naturally impressed. At least many of us thought we should investigate the matter in connection with our own potato plantings.

Someone asked him how much seed he planted per acre, and how it was cut. He stated that he preferred square, chunky seed pieces of about an ounce in weight. He noted too that the cut surface of the seed piece should be a quarter of an inch away from the eye wherever possible because he had observed that weak plants were often produced by seed pieces which had eyes right at the cut surface. There is something in the heart of every tuber which potato specialists find should be in every seed piece and so Meyers added that to his requirements of cutting seed. At least 24 bushels of potatoes were needed to plant each acre as he found it profitable to space his hills 9 x 30 inches.

Careful Planning

Considerable planning is needed to successfully handle a 100-acre potato crop. Meyers is successful at it, to say the least. Not long ago he and one of his sons drove home with $2,000 worth of live foxes in the back end of a Ford. He will never miss the money if they die, but just the same the son was prepared for the new job by first spending a year on a fox ranch. Bill applies system to everything.

He has always employed a balance between seed cutting and planting and in spite of numerous stories to the effect that cut seed can be safely stored if it is sprinkled with sulfur dust, he sticks to the much more reliable practice of sticking all cut potato seed immediately into the moist ground.

This ground is full of organic matter, but he keeps building it up and adding more. Cover crops of rye are a hobby of his. He finds it more profitable to use commercial fertilizers where the soil is full of organic matter.

Bill had considerable to say concerning potato fertilizers. He has come through the time when muckland potatoes had a bad reputation for quality. His observations made over a period of time back up the recent findings of science. He noted that muckland potatoes grown in the early days before balanced fertilizers were used were always poor cookers. Where the grower failed to use enough high-grade potash the potatoes often turned black during the process of cooking. A 3-9-18 is the fertilizer which best meets the conditions of Bill's farm. today. A quick start is possible because there is sufficient available nitrogen in the 3-9-18. Bill likes to have this nitrogen in the ammonium sulfate form because of the acid effect of such goods. Bill knows that acid kills potato scab in his soil as do green manure crops.

As to the amount used, he finds it profitable to drill from 800 to 1,200 pounds per acre in the row at the time of planting. His modern planter mixes this 3-9-18 with the soil just before the seed is dropped.

Crisp, golden-brown French-fried potatoes can be prepared from the muckland potatoes grown on Meyer's farms. The inferior quality of the early days is gone and in its place there is a much higher yielding potato of the highest quality. The quality of the properly fertilized potatoes is so good that the consumers are willing to pay a premium for them.

Deep plowing and thorough preparation of the seed bed are rigidly enforced by Meyers. Level shallow cultivations are his method of weed control. The first time over he sets the cultivator deep and close. After that

(*Turn to page* 53)

English Blue Grass

By M. D. Butler

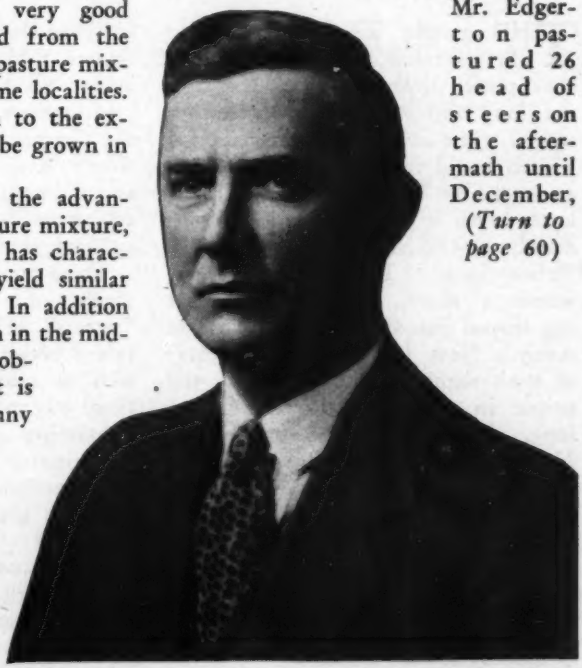
County Agent, Marion, Indiana

ENGLISH blue grass (meadow fescue as a seed crop is relatively an uncommon source of farm income, although in a few cases very good profits have been derived from the crop. Its advantages in a pasture mixture are appreciated in some localities. However it is not grown to the extent that it probably will be grown in the next few seasons.

In order to appreciate the advantages of the crop in a pasture mixture, one should know that it has characteristics of growth and yield similar to Kentucky blue grass. In addition it does not dry out as much in the middle of the summer, and observation indicates that it is the most palatable of any grass commonly grown in this locality.

The accompanying illustration shows the seed crop grown by Mr. Plamer Edgerton of Grant county, Ind., during the year 1928. This crop of 550 bu. was produced from 37 acres and was sold for $1,200 through a cooperative organization of growers. Following the harvesting of the crop Mr. Edgerton pastured 26 head of steers on the aftermath until December,

(*Turn to page 60*)



Mr. Plamer Edgerton is a leader, and likes to try new things.

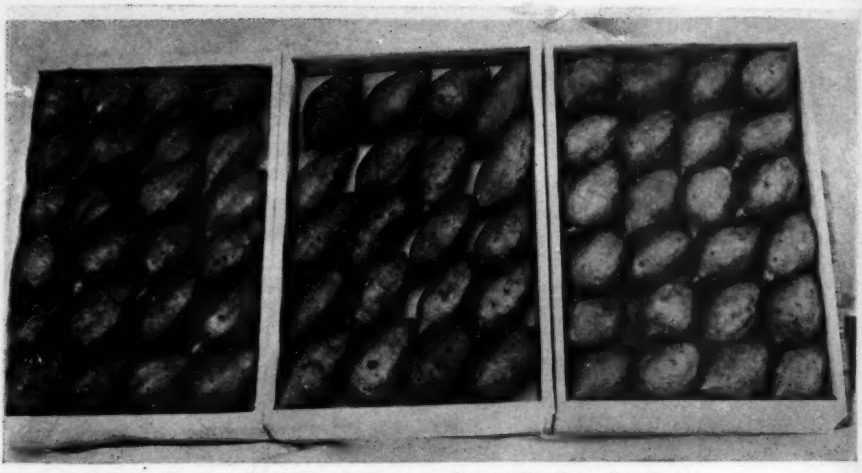


Fig. 1. Chunky Sweet Potatoes of Desirable Shape for Market.

How Potassium Affects Sweet Potatoes

Peculiar Relationship of Potassium to the Shape of Sweet Potatoes Proved by Horticultural Staff of New Jersey Experiment Station

Reprinted from New Jersey Agriculture, June, 1929

THE people in eastern United States relish sweet potatoes but they prefer them short and fat and not long and lean like a Pittsburgh stogie. Just imagine the reception a waiter would receive from a guest at an exclusive hotel if he served the latter with a sweet potato approximately 1½ inches in diameter and 10 inches long. The eastern public wants a short, chunky, somewhat egg-shaped potato that cooks dry and mealy. New Jersey grown "sweets" of such shape and quality bring top prices in eastern markets, whereas long, thin potatoes are undesirable. New Jersey annually plants more than 15,000 acres of sweet potatoes and obtains an annual crop exceeding 2,500,000 bushels, valued at over $3,000,000.

How to produce large crops of chunky sweet potatoes consistently is no small economic problem in New Jersey.

Professor L. G. Schermerhorn first attacked this problem by means of extensive field experiments with fertilizers. Several New Jersey sweet potato growers, including G. L. Purzner of Germania, George Newman of Tom's River, and Charles Underhill and Edward Voorhees of Lakewood, cooperated by furnishing the land and assisting in the cultural operations.

These experiments proved that good yields of chunky Yellow Jersey "sweets" (Fig. 1) could not be obtained consistently on the light sandy soils of southern New Jersey unless there was applied to the soil a fertilizer containing a considerable amount of potassium in relation to the nitrogen. If potassium was low in relation to nitrogen the potatoes were long and thin.

At the conclusion of five years of field experiments, Schermerhorn was in a position to advise the sweet potato growers of the state to apply about 1,000 to 1,500 pounds of a 3-8-8 fertilizer mixture per acre, the

formula and the amount of fertilizer to be varied according to the type and fertility of the soil.

The field experiments demonstrated that applications of certain proportions of potassium and nitrogen in the fertilizer mixture would enable growers to obtain the maximum possible yields of chunky sweet potatoes —an excellent practical result of field experiments. But they did not show why potassium produced this effect. At least one western research worker was hesitant in accepting the conclusions of Schermerhorn and maintained that chunky sweet potatoes are the result of a stiff, impervious soil.

Merely to know how to obtain a certain result may be satisfactory for a time, but sooner or later it becomes important to know why this result is obtained. It is usually difficult to discover or prove a new law or principle of plant growth by means of field fertilizer experiments alone, because of the numerous variables, such as soil type, fertility, moisture supply, and temperature.

During the period of 1926-1928 sweet potato plants, all propagated from the same mother root, were grown in pots of white quartz sand in the greenhouse. This sand furnished a plant growing medium entirely free from nutrients, except for those artificially s u p p l ied. Moisture and temperature factors also were within the control of the investigators. Dr. W. Rei Robbins was in charge of this phase of the work.

The sand culture experiments soon revealed that the so-called chunkiness in form of sweet potatoes is directly associated with a high percentage of protein* in the roots and a high nitrate nutrient treatment, whereas long thin potatoes higher in percentage of carbohydrates and much lower in protein were developed on plants receiving a low nitrate supply. At first thought this might seem to be contrary to the field results of Schermerhorn, but let us follow the investigation further.

During the first year under glass

*The term "protein" as employed in this article is synonomous with total nitrate- and ammonia-free nitrogen. Analysis of this fraction shows it to be made up of true proteins, and simple and complex amino acids. The detailed analytical and experimental results will be published soon in the form of a research bulletin from this experiment station.

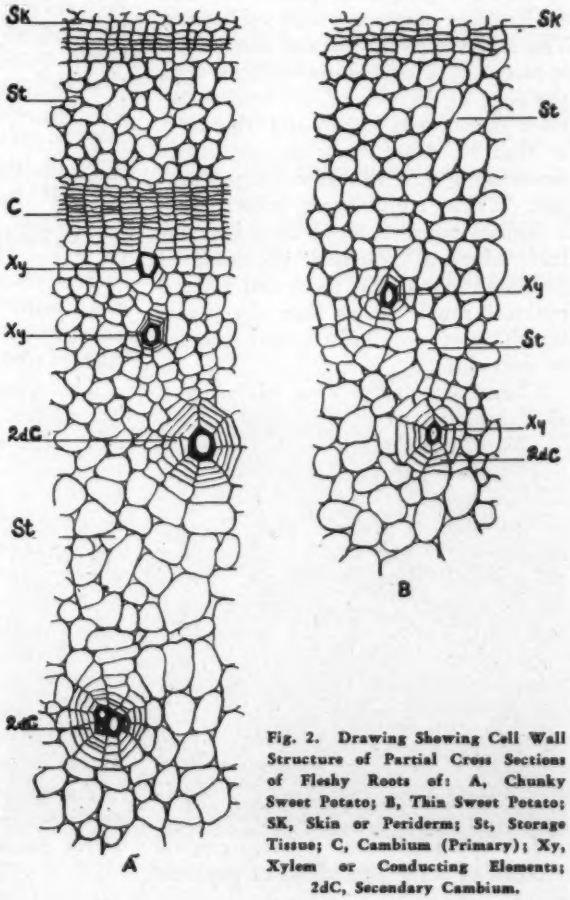


Fig. 2. Drawing Showing Cell Wall Structure of Partial Cross Sections of Fleshy Roots of: A, Chunky Sweet Potato; B, Thin Sweet Potato; SK, Skin or Periderm; St, Storage Tissue; C, Cambium (Primary); Xy, Xylem or Conducting Elements; 2dC, Secondary Cambium.

no controlled experiments with potassium were undertaken but during the following two years sweet potato plants were grown with an abundant nitrate supply but with potassium limited in some cases. It was found that the rate of vegetative growth of the tops was relatively slow with low potassium treatment even though abundant nitrates were present in the nutrient solution. The size of leaves, length of petioles, and growth of stems were not as great as occurred on plants receiving an abundant potassium supply.

Fig. 3. Thin Sweet Potato, Undesirable for Market.

Plants Looked Healthy

The low potassium plants did not exhibit any apparent sign of injury. The leaves were green and showed no apparent lack of chlorophyll; in fact, the type of growth of the low potassium plants was apparently the same as that of other sweet potato plants receiving a relatively low nitrate supply. Those which were grown with a limited potassium but abundant nitrate nutrient treatment accumulated carbohydrates in the roots and formed potatoes much earlier than the plants which were not limited with respect to potassium.

Chemical analyses for nitrogenous and carbohydrate fractions by Dr. G. T. Nightingale and Dr. Robbins revealed that limiting the supply of potassium apparently decreased the rate of protein synthesis; that is, the change of carbohydrates and nitrates to protein. Because protein formed slowly, through lack of abundant potassium, carbohydrates necessarily accumulated in the storage roots, accompanying which there was an early development of potatoes.

Apparently the potassium supply available to the plants was not so limited under these experimental conditions as to greatly restrict carbohydrate manufacture. Photographic records of form and yields of potatoes obtained in each treatment were obtained by Prof. M. A. Blake.

How a Chunky Sweet Potato Develops

But just how does this explain the development of a chunky sweet potato?

Schermerhorn has found that an ideal commercial chunky sweet potato should be approximately 4.5 inches long by 2.5 inches thick. It is therefore apparent that to obtain this form the storage root must increase relatively rapidly in diameter in proportion to length. This is brought about by the development of many new storage cells (fig. 2, St.) which originate, in large part, from the primary cambium.

Growth Structure Studied

The third phase of the "why" of the chunky vs. the long thin sweet potato was a study of the cell structure of the two types of roots.

The chunky potatoes possessed a big active primary cambium region, illustrated at *C* in figure 2A, whereas the long thin potatoes were practically without a primary cambium, as may be seen in figure 2B. In other words, the relatively large diameter of the chunky sweet potato is directly due to the rapid formation of the new cells produced by the primary cambium. Cambium tissue is composed in large part of protein, and, as has already been shown, protein formation does not occur rapidly without an abundance of potassium.

An adequate supply of potassium is therefore essential in order that the sweet potato may form protein of a

(*Turn to page* 54)

Good Celery

By A. E. Wilkinson

Vegetable Specialist, Connecticut Agricultural College

WHEN one speaks of good celery in Connecticut, those who know turn towards Louis R. Peckham of Norwich, Connecticut. To say that Mr. Peckham is the best celery raiser in the state is putting it rather mildly. Just glance at any one of the illustrations and see the celery that he raises and one wonders who competes with him. In his own native city and nearby places the answer is no one. If he grew product enough to take it elsewhere it would be the same answer.

Just what does Mr. Peckham do to grow such excellent celery, and when I say excellent I not only mean large size but a tender, crisp quality and excellent flavor. A study of his methods may throw light on how he is able to produce the best. He has settled finally on one variety—Golden Plume. I say settled on one because he has tried almost every variety that he could obtain before he had settled on this as the best one for him. Not only has he tried different varieties, but he has tried a number of the best strains. Any strain that seemed to stand out above its neighbor he has compared with the one that he was growing at that time. In many of these strains he has been very much disappointed. In some others he has found improvement. Even today he is looking constantly for greater improvement in production.

As the amount of celery that Mr. Peckham raises is limited, only approximately 30,000 plants, he sows most of his seed March 1. Within 10 days another small quantity is planted, and this continues until approximately May 15. The seedlings when exceedingly small are picked out into other flats and given proper spacing so that they can develop into strong individuals. Of course this early starting means inside a greenhouse. In fact the seedlings are kept inside the greenhouse until hardening-off time approaches. They are then placed in frames and from there are set in the field. By this method he has a succession in planting and transplanting which results in a succession in selling.

Part of the soil Mr. Peckham uses

L. R. Peckham (right) uses a wheelbarrow sprayer on his celery.

for raising this crop is a very black soil. It is not muck but right on the edge of muck. There was a depression in his small farm and he dug a ditch through this depression and from the ditch ran out almost 800 feet of drain tile. This soil has been made neutral by heavy applications of lime. Application of lime took place almost yearly. Mr. Peckham tests his soil for lime content and therefore knows how much is needed. He does not apply lime unless the test indicates a need. His soil is plowed with a tractor as near ten inches deep as possible and thoroughly fined.

Plenty of Plant Food

Many growers of celery broadcast the fertilizer and work it in. Mr. Peckham does not feel that this method on his soil will give the best results. He has a very unique way of fertilizing, a method which I believe would be of interest to a great many users of artificial fertilizers. In spite of all experimental evidence he does not use stable manures. In fact he does not keep animals of any nature nor does he buy stable manure for field use. After planting the crop in the field the plants are allowed to show some new growth. As soon as this shows at all, nitrate of soda at the rate of 300 pounds per acre is applied close to the plants. The idea in this is to get the nitrate dissolved and into the soil by the time the roots are developed enough to take it up and to give a push to the plants. Mr. Peckham has tried both sulphate of ammonia and calcium nitrate in comparison with nitrate of soda but so far nitrate of soda has given best what he desires.

The noticeable new growth immediately indicates to Mr. Peckham that the plant is now ready for more fertilizer and in his language he gives it a "shot" of 5-8-7. This is applied each side of the row and cultivated in. In about two or three weeks another "shot" of 5-8-7 is given and if the growth is not exactly to Mr. Peckham's satisfaction another "shot" of nitrate of soda is applied and worked in. Three weeks later, or if growth indicates a need, still more of the 5-8-7 and nitrate of soda are applied both sides of the row and worked in. It is readily seen by this that Mr. Peckham is feeding his plants fertilizer throughout the season. Just how much fertilizer he uses per acre is a big question. I know some years as high as 1,000 pounds an acre of nitrate of soda are used and more than 3,000

Mr. Peckham explains his methods of blanching a good crop of celery.

pounds of 5-8-7. It is not the amount of fertilizer according to Mr. Peckham, but it is whether or not the plants keep growing; or as he told me sometime ago, "I mean to have enough plant food for the plants at all times."

The shape of the land that he uses for raising celery necessitates much hand labor. This will be brought out in some of the operations which he uses. In setting the celery in the field the land is marked off in rows 27 inches apart, and the plants are placed six inches apart in the row. Different distances have been tried out by Mr. Peckham, but this gives him the largest percentage of the best type of celery. If he wishes a larger plant, he has found that 8 inches between plants and the same distance between rows will give him what he is after. On transplanting to the field, the flats are soaked with water. The soil in the flat is blocked out, and a bunch of roots as well as a very well-developed, small plant is placed in the ground. The celery plant does not wilt at all but immediately sends out new roots and starts its growth. Mr. Peckham has tried the method of raising seedlings in rows, pulling them, and immediately transplanting to the field, and he has not met with the success that he has with the transplanted into flats method.

Hardly are the plants firmly established in the outside soil before cultivation begins. The soil is kept clean of weeds at all times.

About 10 days after the seedlings are placed in the soil, finger working of the soil takes place. It is a joy to watch Mr. Peckham and his assistant Mr. Rose do this work. They never stop. Kneeling at one end of the row and just walking on their knees to the other end with the two speedy hands of each man being worked just as rapidly as is possible, it does not take them long to run through 30,000 celery.

Spraying Is Important

As to spraying, Mr. Peckham uses a home-made Bordeaux consisting of five pounds of copper sulphate, five pounds of lime, and 50 gallons of water. He cannot use a horse-drawn sprayer on his land because of the very short rows, nearness to building, and the ditch. He uses a wheelbarrow sprayer and with this small equipment has been able to thoroughly control blight. It is largely due to the fact that he is so painstaking and has the under side, upper side, and all sides of the foliage completely covered with Bordeaux. He means to spray often enough to keep the foliage covered as fast as new growth develops, at least once in every ten days throughout the season. Occasionally when rains are very frequent spraying is more frequent.

When the growth is large enough and dense enough, causing the centers to take on a lighter tinge of color, Mr.

(*Turn to page* 52)

A bundle of a dozen bunches of jumbo celery.

LOUISIANA

Experiment Station

By Bentley B. Mackay

Agricultural Editor, Louisiana State University

WHEN a greater portion of our country, with the exception of the states bordering the Atlantic, was unknown and unexplored territory, Louisiana was being colonized and the rich alluvial lands cultivated. The halcyon days "of the Empire" were prior to the Civil War when the great sugar and cotton planters made fortunes, erected magnificent homes, and filled them with the choicest treasures that Europe afforded. Like the barons of old, every man's home was his castle and he directed his slaves and administered his estate as he saw fit. However, there were two things that a Southern "gentleman" must not be guilty of: He must never be discourteous to a guest, and he must never perform manual labor, the latter being reserved for slaves.

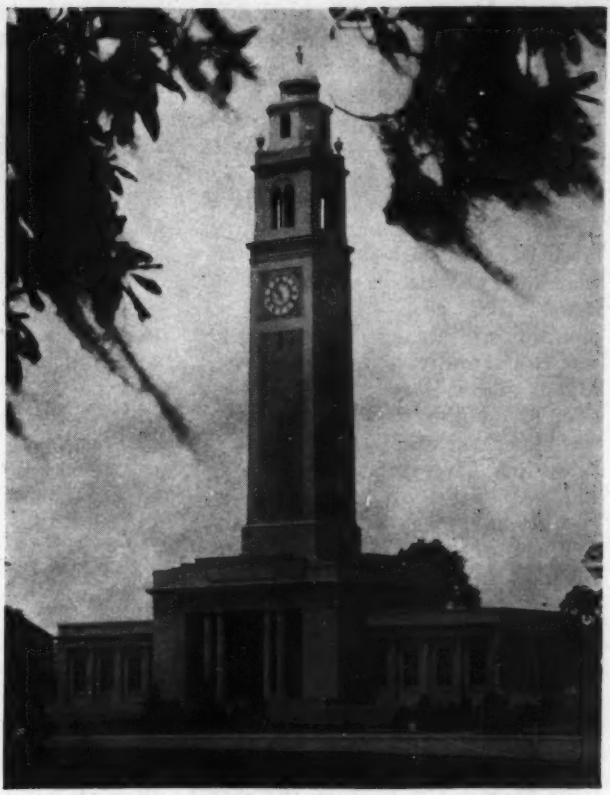
Came the Civil War. Fortunes were wiped out; plantation homes ruined; but those who came back fought bravely to rebuild their shattered fortunes and with land as rich as the valley of the Nile, Louisiana's "comeback" after the war was slow but sure.

Then various diseases showed up in the cane and cotton fields. Seemingly inexhaustible soils became depleted. It became apparent to the sugar planters, especially, that something must be done, and so in 1885, a number of the leading planters subscribed several thousand dollars and established the first "experiment station" near New Orleans. Dr. W. C. Stubbs, professor of chemistry, Auburn, Alabama, was elected to direct the work of importing new varieties of sugar cane, developing the use of sugar mills for grinding sorghum thus prolonging the period of activity for that industry, and learning methods of restoring soil fertility.

From the importation of new cane varieties came the D. 74, which, up until the introduction of root rot and mosaic disease in about 1920, proved to be worth millions of dollars to the growers.

Entrance to the agricultural buildings.

The Louisiana sugar planters were just two years ahead of the United States government, for in 1887, the Hatch Act was passed by Congress. Louisiana established three stations under this act: one at Baton Rouge, the headquarters of the Louisiana State University; another at Kenner, later moved to Audubon Park, New Orleans; and one at Calhoun in the northern section of the state. The total sum of $15,000 was divided equally between these stations and with such magnificent funds, great achievements were expected. Small state and parish appropriations were also made. W. C. Stubbs, A.M., Ph.D., was made Director of the stations, with a limited staff under his supervision.



The campanile, or war memorial tower, at the new Louisiana State University.

The Calhoun station, embracing about 300 acres, was devoted to experiments dealing with corn, cotton, tobacco, and miscellaneous crops grown in North Louisiana and with cattle, sheep, and hogs. One hundred and thirty acres at Audubon Park were used for sugar cane investigational work, both in the field and in the laboratory. Much work was done in improving methods of manipulating cane juices.

Three Directors

The station at the Louisiana State University contained 210 acres and was situated on the bluff lands of the Mississippi River, acting as the dividing line between the sugar and rice lands of South Louisiana and the cotton lands of the north. Various experiments with forage crops, cane, cotton, corn, truck crops, etc. were begun.

Louisiana was fortunate in retaining its experiment station director over a long period of years. Dr. W. C. Stubbs, the first director, remained in office from 1885 to 1905, when he retired to private life. Dr. W. R. Dodson, assistant director was made director and served in this capacity from 1905 to 1928, when he resigned to go with the United States Department of Agriculture. He was succeeded by Dr. C. T. Dowell, formerly of Oklahoma.

If the Louisiana State University Agricultural Experiment Station had done nothing but find uses for the by-products of sugar cane, rice, and cotton, the returns from these items

alone would pay a hundredfold every cent of money that has been spent on experimental work.

When Dr. Dodson and Dr. W. H. Dalrymple, veterinarian—one of the most outstanding in the United States—began experiments on the feed value of lespedeza hay, blackstrap molasses, rice by-products, and cottonseed meal, most of these valuable by-products were then considered worthless. Molasses from the sugar mills was pumped into the ditches and water was forced on it to wash it into the bayous and swamps, a costly operation. Rice polish, that important feed, was blown out onto the surface of the Mississippi River to be washed away. The feed value of cotton seed was just becoming known.

When the results obtained from feeding blackstrap, rice polish, and cottonseed meal as supplemental rations were published, the major industries were stimulated beyond their wildest dreams. It is impossible to even estimate the millions of dollars that have been brought into Louisiana by the utilization of blackstrap molasses alone. The value of rice polish and cottonseed meal, of course, needs no comment.

Investigate Cattle Tick

Realizing that the Texas Fever Tick was the main reason for the lack of cattle development in Louisiana, Dr. Dodson, Dr. Dalrymple, and Professor H. A. Morgan (now President of the University of Tennessee) studied the life history of the tick. This was in 1901, and even five years prior to this systematic study, the immunization of Northern-grown cattle by the injection of the blood of cattle immune to Texas fever was carried on with varying successes.

As late as 1890, ticks were not suspected as having any connection with Texas fever, and nothing definite was done by the Bureau of Animal Industry at Washington until Louisiana and other Southern state experiment station workers prevailed upon Dr. Cooper Curtice in charge of the Bureau to conduct investigations along this line. Believing that immunization of all cattle was not practicable, experiment station workers, began studying some means of eradicating the tick. Studies of the life history of the tick, symptoms of the disease, the response to medical treatment of animals suffering from the fever, and microscopic studies of the causative agent, serum treatment, etc. were made. Many methods were employed to kill ticks. The application of oils and arsenicals in solutions gave the first encouraging results, and although the Bureau of Animal Industry was the first to use the dipping vat method, the Louisiana station had used the arsenical solution as a spray.

Advocate Clean Pastures

The workers were responsible for the advocation of clean pastures by keeping cattle away until the ticks died of starvation and then cleaning the cattle of ticks and putting them on tick-free pastures. This was tried out on a commercial scale from 1901 to 1904, when a carload of fine Angus beeves from north of the ticky area were brought to Baton Rouge, immunized, and afterward put on clean pastures. The station produced a car of cattle that topped the Chicago market on January 8, 1904.

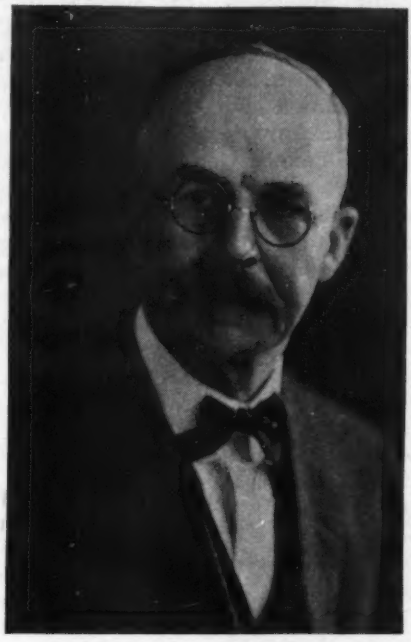
Having proved that tick eradication was possible, efforts were made to secure government aid in eradicating this pest that has cost—and to a limited extent still is costing—the South millions of dollars annually.

It is one of life's little ironies, that it was the Louisiana Experiment Station which led the way in tick eradication work and that a Louisiana Congressman, now Senator Joseph E. Ransdell, fathered the first bill to secure federal funds for tick eradication, and despite this fact, Louisiana still ranks low in the number of Southern states now free or practically free of this scourge. However, indications are that within the next few years, the

fever tick will be totally eradicated.

A great deal of time was devoted to the study of glanders, anthrax, blackleg, nodular disease of intestines of sheep, etc. Anthrax, or charbon, formerly one of the state's most deadly diseases in livestock, due to vaccination and sanitary measures is no longer a retarding factor.

Always an advocate of soil improvement, the experiment station, so far as records show, was the first one to differentiate the organism producing tubercles on the roots of cowpeas as being a separate group from those producing the tubercles on clovers. As a result of experimental work with velvet beans, soybeans—and recently with yellow sweet clover as a winter cover crop—thousands of acres of land in Louisiana are being restored to their former state of fertility. Great credit is due the Louisiana Agricultural Extension Division for conducting a campaign of education in regard to these crops.



W. R. Dodson, former dean of the agricultural college and director of the experiment station.

The New University

As the state grew in wealth, many citizens realized that the cramped quarters of the historic old Louisiana State University, of which General William Tecumseh Sherman was the first president, were inadequate. The erection of a greater agricultural and mechanical college on a new site was suggested. Every gubernatorial candidate was requested to support the greater agricultural college program. Day and night, members of the experiment station and extension staff went over the state explaining the need for greater agricultural expansion.

There was no greater advocate of this program than Governor John M. Parker. It was his dream to have erected one of the best equipped colleges in the country, where farm boys and girls as well as other students might come and work their way through school. It was his promise during 1920 that such a college would be built without additional cost to the taxpayers of the state. Governor Parker, for the first time, succeeded in having a two per cent severance tax placed on all natural resources. "Why should not those who take the oil, gas, salt, timber, and gas from our state be required to pay a small severance tax?"

In September 1925, the Greater Louisiana State University was opened to the public. For the first time in the history of great state universities, a modern and well-equipped plant, embracing 2,000 acres of ground, and a cost of more than $4,000,000 was dedicated to agriculture and the sciences. The old plant, still beautiful, has since been converted into a school for the co-eds of Louisiana State University.

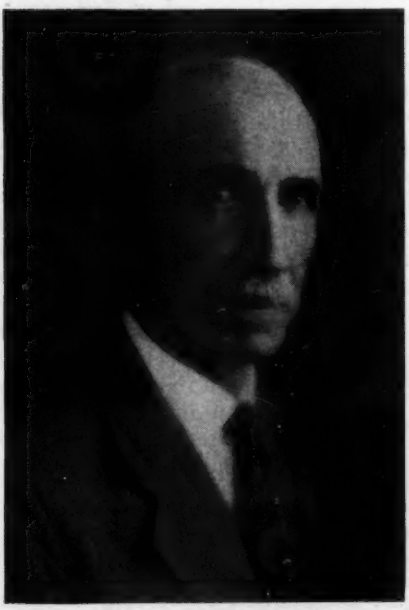
New Inspirations

The magnificent buildings are Italian Renaissance. Theodore C. Link, the world-famous architect who de-

signed Leland Stanford, and was the builder of the Union Station in St. Louis, the Mississippi Agricultural and Mechanical College, the Mississippi State Capitol, and other buildings throughout the country, declared that the Louisiana State University was his masterpiece. With ample acreage and with soil representing practically all the types to be found in Louisiana, experimental work at the home station took on a new lease of life.

Since the Audubon station was closed and all of the sugar equipment and laboratory brought to Baton Rouge, the station is devoting a great deal of time to sugar cane experiments. The sugar planter seemed doomed to hard luck, for there came reports from the field that a leaf disease, known in the tropics, was causing havoc. The hardy varieties developed by the station had been able to make fair yields despite the ravages of root rot and the borer, but when mosaic was added, the future seemed dark indeed.

In 1922 the Louisiana Station received from the government station at Canal Point 3,500 varieties of seedling canes from which it was hoped to secure a variety resistant to root rot and tolerant to mosaic. Space does not permit details relating to the hundreds of variety tests, fertilizer tests, etc., that have been conducted. The American Sugar Cane League and other interested planters, together with the United States Department of Agriculture, cooperated.



W. B. Mercier, director of agricultural extension.

The Java canes, P. O. J. 213, 234, 36, and others gave bright promise. As fast as these canes became available at the station, they were planted in test fields located in various parts of the "Sugar Bowl" in order that equal and rapid distribution might be made to all of the planters.

New Canes Yield Well

Science came again to the rescue, as statistical data compiled by the Bureau of Agricultural economics will show. During 1926, which was the last year in which Louisiana's sugar was made entirely from the old varieties, 127,916 acres of sugar cane gave a per acre yield of 6.7 tons per acre, and the total production of sugar was 47,166 short tons, the lowest in 50 years. In 1927, approximately one-fourth of the total acreage under cultivation was planted with the mosaic-tolerant varieties. From the total of 72,987 acres harvested the yield of cane was 13.4 tons per acre and 70,792 short tons of sugar.

In 1928 estimates are that more than three-fourths of the total acreage was planted to P. O. J. 213, 36, 234, and other Java canes. From 178,000 acres planted, of which it was estimated that the cane of 144,500 acres was used for sugar, a yield of 17.5 tons of cane per acre was harvested producing 171,000 short tons of sugar. During 1929 it is estimated that P. O. J. canes will have superseded all of the old varieties and with favorable weather production will reach between 5-600,000,000 pounds

(*Turn to page* 54)

The Farmer Cuts Production Costs

By Arthur P. Chew

United States Department of Agriculture

IT is admittedly difficult to measure costs of production on the farm. Questionnaires addressed to farmers about their production costs may or may not bring entirely trustworthy replies. When men have a grievance they naturally like to make out a case for it. Distressed farmers therefore are not always unbiased reporters on the subject of agricultural costs of production. But even when reliable figures as to costs on different farms can be obtained, the question arises whether these costs are representative. Costs vary widely on different farms, sometimes because the farms differ in fertility and sometimes because they are managed differently. And of course average costs don't give one a real line on the relationship between outgo and income in agriculture. It is more important to know how the costs of individual farmers are distributed around the average—whether closely bunched or widely spread out.

Production Costs Decrease

Recent economic studies demonstrate, nevertheless, that farm costs of production have fallen sharply in recent years. These studies are of a two-fold character. In the first place they draw important conclusions from census data, from statistics of relative prices and from the quantitative output of agriculture. R. J. McFall, writing in the Annals of the American Academy of Political and Social Science, concludes from such data that the cost per unit of output in American agriculture must have decreased at least 17 per cent during the decade 1913-1923. Previous estimates of farm production costs for this decade, Mr. McFall points out, were based on the inaccurate assumption that the number of persons engaged in agriculture during that period remained constant. Recently published census data for 1925 showed that the number of persons engaged in agriculture from 1913 to 1923 declined. Former studies which did not allow for this fact gave a cost index that Mr. McFall now declares was too high.

Output Increases

Agricultural economists agree that the output of American agriculture has increased nearly 20 per cent in the last decade, though the acreage in farms has decreased slightly and the number of persons engaged in agriculture has fallen greatly. In this period farmers have invested heavily in power machinery. This combination of circumstances necessarily seems to indicate decreasing unit costs of production. Not all the statistical studies made on the subject have borne out that inference. Some estimates of operating costs in agriculture for recent years show increases approximately offsetting the accompanying increase in production during the same period. However, as Mr. McFall shows, these operating costs include considerable expense incurred for agricultural implements, which may be expected to

have productive capacity for many years. Part of their purchase cost should therefore be transferred from operating to capital account. If this is done, the conclusion cannot be resisted that American agriculture since the war has increased the volume of its production while decreasing its total costs.

Machinery Largely Responsible

If we ask specifically how this has been accomplished, an impressive answer will be found in material reported by L. W. Wallace, Executive Secretary of the American Engineering Council. It must suffice to mention only a few of the proofs Mr. Wallace gives that agricultural costs are declining. This class of evidence, with most people, will be more convincing than that derived from price comparisons and index numbers. Modern corn binders, Mr. Wallace notes, will do as much work in four hours as can be done by hand in six. This tends to explain why some corn belt farms grow corn at a cost of less than 15 cents a bushel compared with a cost of more than 75 cents on nearby farms. Recent developments in wheat harvesting machinery have produced equally astonishing changes in production costs. In western Nebraska in 1927 it cost 32 cents to produce a bushel of wheat, compared with 86 cents in eastern Nebraska. Modern farm equipment combined with skillful management chiefly accounts for the success of the low-cost farms.

Machinery is important in dairying as well as in the production of field crops. Investigations made in Indiana, according to Mr. Wallace, showed that the time required to hand-milk each cow per day ranged from 13.5 to 17.6 man minutes, though the milker did not take care of the equipment he used. Milking each cow with a milking machine and providing also for the care of the machine, occupied only 8 to 9 man minutes per day. Such aids to dairying, accompanied by improved breeding and feeding, explain why the cost of producing butterfat on efficient farms is frequently as low as 29 cents a pound, compared with 71 cents on dairy farms not following the best modern methods. In a Minnesota study covering 25 farms the returns from cows ranged from a loss of $36 to a profit of $67 per cow per year.

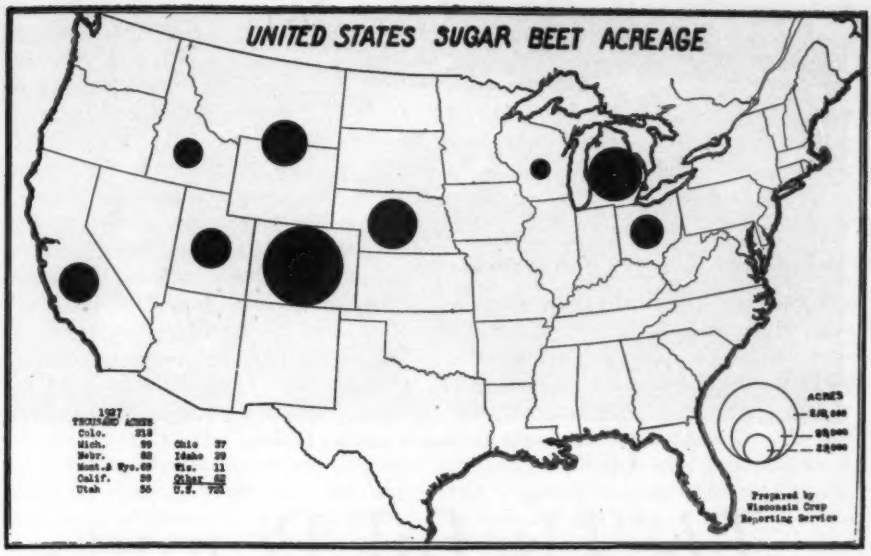
Advances made in corn growing and wheat growing are well known. Four-row corn planters which will plant corn at the rate of 40 acres per day are in use on an increasing number of corn belt farms. Rotary hoes for tilling corn, and also soybeans, beets and other crops, have been developed. Corn binders that cut the plant at the ground level reduce the devastation of the corn borer. One man with improved tractor-drawn machinery, says Mr. Wallace, can cultivate 320 acres of wheat and work only from 100 to 152 days a year.

Tractor power and improved farm machinery are revolutionizing cotton growing. In the Corpus Christi area, the Texas Agricultural College found that one man planted on an average 37.5 acres with a four-row planter drawn by a tractor. One man with a four-row tractor-drawn outfit was able to cultivate 43.5 acres. Sledding cotton has greatly reduced harvesting costs, and promising cotton picking machines have been developed. Tractors with cotton duster or spraying attachments cover as much as 100 acres in 10 hours.

Fertilizers Important

These developments make the going hard for the man who can not keep up with the procession, but at the same time bring substantial profits to the pioneers. Moreover, data assembled by Dr. O. E. Baker of the U. S. Department of Agriculture, suggest that the adoption of improved methods is not by any means confined to a small minority of the farmers. It is general. No other conclusion can be

(*Turn to page 56*)



SUGAR BEETS ¶ *Tenth of this series*

By Walter H. Ebling

Agricultural Statistician, Wisconsin

WHILE sugar production in the United States is not a major agricultural industry, a total of more than one million two hundred thousand tons are estimated to have been produced in the country in 1928. Of this over 85 per cent was beet sugar and the balance cane sugar.

In the United States sugar beet production is found in a group of states, largely outside of the corn belt. An eastern group of states consisting of Ohio, Michigan, and Wisconsin have a beet sugar industry on the northern edge of the corn belt. In the western states the sugar beet industry is found west of the corn belt proper, Colorado being the leading state, with about 30 per cent of the United States acreage. Michigan ranks second and Nebraska third in acreage. In the western states irrigation of the crop is common. For the most part the production is on relatively small fields and in crop rotations. Among the nations the United States ranks fourth in sugar beet acreage, Russia being first, Germany second, and Czecho-Slovakia third.

The sugar beet crop is an intertilled root crop with a rather high labor requirement and it is very

(*Turn to page* 50)

In some parts of the South, peanuts still are harvested by hand.

The Useful Peanut

By U. V. Wilcox

Washington, D. C.

"DOUBLE - JOINTED jumbo peanuts, five a bag," cries the vendor at the baseball game, the circus, or the amusement park.

As the grown-ups and the young 'uns eat the gentle goober, little do they appreciate that this once despised peanut is becoming an important product as far as uses for the present civilization is concerned.

Peanuts are supposed to have originated in Brazil, but were taken in slave ships to Africa, Spain, and other countries at a very early date, and the types of peanuts known in this country were probably developed first in Spain and various parts of Africa. Now with modern labor-saving machinery perfected that makes cleaning and shelling easy and economical, the peanut has become one of the important crops of America. Aside from being the ideal food for elephants and the baseball fan, the peanut serves in at least 167 different ways.

Just as the Standard Oil Company found out that petroleum can be put to innumerable and almost incredible uses, just as the packers learned how to use up the odds and ends of their cattle under hundreds of ingenious disguises, so modern science has found that the shell of the peanut is a warehouse bursting with varied products never before suspected of being hidden away there.

When full advantage is taken of its versatility, the peanut will become a common household utility. You can take your bath in the morning with soap made from it. You can polish your shoes with one of its derivatives. You could enjoy a perfectly good breakfast, luncheon, or dinner and eat nothing that hasn't peanuts in it. And, finally, before you go to bed you can annoint your head with a lotion made from peanut kernels, which is an excellent foe of dandruff and harmless stimulant for discouraged hair.

Science now rubs the magic peanut as did Alladin his lamp, and behold a hundred and more things are produced. The modern machinery, the injury

wrought by the cotton boll-weevil, and the fact that peanuts are hardy and rarely fail when given a long hot summer now have made them a favorite crop in the South.

There are several varieties of peanuts. The Virginia-type are large-podded and seem to grow best in soils of southeastern Virginia, northeastern North Carolina, and central Tennessee. Elsewhere in the peanut belt the small-podded Spanish is the preferred type, although many runners, with pods of medium size, are planted in Alabama and Florida.

Dried and Shelled

After the peanut plants are dug or pulled from the ground they are left in a stack or windrow to cure for a month. This lessens the tendency of the kernels to shrivel. Then the pods are picked from the vines by means of a mechanical picker or threshing machine and taken to the cleaning or shelling factory. Large storage houses at a number of the factory points provide a means for holding over peanuts from the time of harvest until they are needed later in the season.

Before peanuts in the shell are considered ready for bagging, they pass through a revolving reel, where sand and dirt drop out, through a machine for cutting off the little stems attached to the pods, past various fans to blow out the chaff, light stems and lightweight pods, through grading machines and even a polishing drum, which contains a white, dustlike powder in which the pods tumble around sufficiently to give them a fairly uniform color. Finally the pods pass along revolving, endless belts, along which workers are seated to remove discolored, misshapen pods and any remaining foreign material.

No such elaborate steps are taken with the peanuts which are to be shelled. The shelling is accomplished by forcing the pods between two cylinders, the inner one revolving while the outer is stationary. To the revolving cylinder are attached two steel "beaters," which strike and crack the hulls of the nuts.

Many Uses Developed

By grinding up the mealy kernels there is made peanut coffee which is as delicious as real coffee and tastes like it, but has no caffein. By shredding the shells ordinarily left to the tender mercies of the white wings and janitors there is secured two or three varieties of excellent and very nutritive breakfast foods. By squeezing the kernels there is drained off 32 different kinds of milk, many grades of which are richer and as healthful as cow's milk itself.

But that is not all. Sauces scarce-

This machine threshes the stacks and bags the peanuts.

ly distinguishable from Chili or Worcestershire can be made. Seven different stains for wood are secured from the gritty residue that remains after grinding and mashing. By taking the hearts of the little grains concealed between the halves, food for poultry is manufactured.

The uses of the peanut for medicine are innumerable. A tonic for invalids suffering from lung afflictions and another for tuberculosis sufferers are but two of the most promising. Cargoes of peanuts are shipped from this country to France and Italy to be pressed for oil.

Much of the crop in the South is pressed for oil, and people who live in the neighborhood of the factories buy the "cake" (the residue of the presses) and grind it to meal for making griddle cakes and biscuits. In many peanut sections of the nation this lowly fruit of the ground is utilized for cookery in ways unfamiliar to city dwellers. Appetizing soups are made of them, and when coarse-ground, dried, and bolted, they make palatable 'grits."

Scientists of the United States Department of Agriculture have discovered that the "hay" made from the peanut vines, which can be fed to stock after the peanuts have been harvested, contains more "fat formers" than any other hay except red clover.

It is easily possible to serve a five-course meal with peanuts. A rather thick, brownish consomme can be made of peanuts which have been steamed until the skins fell away, then boiled in salted water until they became very tender. A little beefsteak and a few grains of cayenne pepper may be added and the result is an appetizing soup.

Flaky rolls are made of ground-up peanuts mixed with melted butter, eggs, and flour.

Tender "chicken" can be made of peanuts which have been blanched and ground until they became an oily paste. This is stirred with well-beaten eggs and some rolled bread crumbs. The mixture is then spread thickly on sliced, boiled, sweet potatoes, then dipped in the white of an egg and fried to a "chicken brown."

The salad is made of roasted peanuts and apples chopped together.

Finally the coffee and cake are served. The "coffee" is not coffee at all, but a healthful and delicious beverage brewed from peanuts. The cake has also been made by using coarsely ground peanuts mixed with sugar, milk, corn starch, and butter.

Other uses of the peanut include shoe polish, baby food, face powder, and the end is still distant.

It is the Spanish and runner peanuts that are sold shelled. They are so uniform in shape that they are well adapted to the penny vending machines. Spanish peanuts are also sold to blend with the Virginia-type nuts in making peanut butter, and for peanut candy. The shelled peanuts of the

(*Turn to page* 51)

Peanut vines are stacked on poles to dry.

Corn History

By E. N. Bressman

Plant Breeder, Oregon Agricultural College

CORN is one of the few important crops which originated in America. It is mentioned in tradition that the Norsemen found corn on this continent in 1002, when they touched this country. Of course, the crop became well known after the discovery of America in 1492 by Columbus and after the first settlers came.

There are two places which appear to be the most logical spots where corn was first grown. These are the highlands of Peru and southern Mexico. In 1914 an explorer found a fossil ear of corn in Peru. This ear of corn is without a doubt many thousands of years old. It is of interest to know that it is very similar to the small varieties that they are still growing in Peru, and rather similar to our ordinary rice popcorn. One outstanding authority thinks that corn originated in Mexico then moved north, reaching the Rio Grande about 700 A. D., and got as far north as Maine by the year 1000.

Of real support to the claim of Mexico as the first home of corn is the finding of two native grasses which are related to corn. These grasses are Teosinte and Gama grass. Teosinte is very similar to corn. It has a tassel like corn. The ear is enclosed in a husk, but there is no cob. The kernels are arranged end to end and number anywhere from 5 to 10. It is extremely easy to make crosses between Teosinte and corn. This shows that there is a close relationship between these crops.

It appears that the Indians grew at least three types of corn known as sweet, flint, and gourdseed. Dent corn, which is the corn of commerce and the ordinary field corn, is not mentioned by any of our earliest writers. It appears that this important type of corn was originated by both accidental and intentional crossing of the flint and the gourdseed types. Mr. H. A. Wallace, Editor of Wallace's Farmer, and the writer developed this theory.

As late as 1858 Iowa farmers were still speaking of yellow flint and gourdseed varieties and not about dent corn, which is now their common corn. Neither the flint or gourdseed varieties were satisfactory. The flint corn was too hard for best results in feeding. On the other hand, the gourdseed corn was too soft and light to have much feeding value. One grower stated that it took about a fourth more of the gourdseed corn to have the same feeding value as flint corn. As late as 1825 it was common to mix the flint and gourdseed varieties. One writer at this time says, "So prevalent are mixtures that I have never examined a field of corn which did not exhibit evident traces of all the corn in general use for field planting, with many others that are not used for this purpose."

(*Turn to page* 51)

Agricultural news writers and editors at the United States Department of Agriculture keep farmers informed of the Department's research.

Agriculture Today

X. Cooperative Extension

By Frank George

AGRICULTURAL events of the last 10 years have produced a profound change in the type of information which county agents and other extension workers are carrying to farmers. Whereas emphasis was formerly placed upon production problems, the effort now is to accentuate the economic phases of agriculture.

"Each State," declares Dr. C. B. Smith, chief of the Office of Cooperative Extension Work in the United States Department of Agriculture, "is coming to see that it is easily possible to keep very busy with demonstration and other phases of extension relating to production, and still not make much progress forward unless the program of work is economically sound. Why plant and fertilize and cultivate more peach orchards if those we now have bear more fruit than the farmer can market profitably? Why place the emphasis on swine production in a region where corn yields are abnormally low?

"Farmers," he adds, "know the penalty of too many potatoes or too many pigs. Under these conditions they must sell their products at prices below cost of production. Extension forces see the need of helping farmers adjust their acreages to meet the normal demands of the country. The Bureau of Agricultural Economics is furnishing data which serve as a guide to farmers along these lines. The extension forces, through farm management demonstrators and others, are bringing this information to the attention of farmers before their crops are planted or their stock bred so that they may have some measure of control of their output and in a degree

forestall disturbing surpluses."

The following three phases of work of the cooperative extension system, Dr. Smith says, are being increasingly emphasized:

1. Development of State-wide agricultural programs predicated on economic facts as a basis for sound State, county, and community extension programs;

2. Carrying to farmers and aiding them in the understanding and application of the "intentions-to-plant" and "intentions to breed" data of the Bureau of Agricultural Economics, in order that farmers may in some degree adjust production to consumption needs;

3. Helping farmers observe a standard of living comparable with that of the urban man with a like investment of capital and labor.

Serve Rural Homes

Discussing the third objective, Dr. Smith declares, "to build up a satisfying home and bring contentment in rural life is regarded as important in extension work as it is to obtain farmers an increased income. The two go hand in hand. To this end, the extension directors of the States are greatly strengthening their home demonstration staffs which specialize in these matters and are multiplying their work with rural boys and girls.

"Rural women are being brought together in clubs, camps, and short courses, and are taught not only technical matters of the home, but opportunity is provided for social intercourse, play, and participation in matters of community welfare. More than 620,000 boys and girls from 10 years to 18 years of age likewise are being brought in touch with the best things in agriculture and given vision as to its possibilities when pursued as a mode of living."

The passage of the Capper-Ketcham Act last year, authorizing an appropriation of $980,000 annually, of which $20,000 goes to each State and the Territory of Hawaii, has made possible a further substantial development and expansion of cooperative extension work. The act also authorized an additional $500,000 to become available for use on July 1, 1929, and annually thereafter. With these additional funds, emphasis in extension work during the current year is being laid on more fundamental extension programs, larger use of significant economic data, more home demonstration agents, and more boys' and girls' 4-H club work.

During the past year, county extension agents reported more than 4,500,000 instances in which improved agricultural practices were adopted by farmers, farm women, and farm boys and girls who were members of 4-H clubs. As a part of the educational program of the service, 772,185 practical demonstrations were carried on by farmers and farm women as object lessons to their neighbors. Boys and girls' 4-H club members completed 776,029 demonstrations.

"The extension service," Dr. Smith declares, "is anxious to extend and strengthen its service to cooperative marketing associations. Extension offi-

Making an agricultural movie for use in extension work.

cials cannot assume responsibility for the organization and direction of cooperative associations, but within this limitation there are many things which they can do to foster and promote the movement.

"Farm productivity per worker has increased greatly, due to improved methods which farmers have acquired through county agents and other agencies. Rendering service to increase yields and improve quality in farm products does not discharge the entire obligation of State and Federal agencies to farmers, as there remains the question of profitable marketing of this increased production and of readjustments which may become necessary, in the light of facts of the situation, between and within producing regions. The need for strong farmers' organizations to meet this broad problem is self-evident.

Assist in Cooperation

"Some of the ways in which county agents and extension marketing specialists can assist in furthering and strengthening the cooperative movement are: Advising and assisting farmers in surveys of the immediate needs of their community or State for agricultural products; discussing before meetings of cooperative associations the principles of cooperative marketing, marketing problems, and the results obtained in research studies which might be adapted by farmers to the particular needs of their market; conducting educational campaigns and meetings for the purpose of bringing to farmers information on the character of the needs of the market for their products; arranging for demonstrations in packing, processing, and standardizing products handled by cooperative marketing organizations, particularly those phases of this work for which farmers are responsible; and assisting in the promotion of cooperative marketing schools in cooperation with marketing associations, agricultural high schools, county farm bureaus, or other agencies."

There are today agricultural extension agents in 2,237 counties out of the 2,900 rural counties in the United States, home demonstration agents in 1,190 counties, and boys' and girls' club agents in 168 counties. The various States cooperating in this work have increased their expenditures so that they are now spending $1.64 of State and county funds for every dollar provided from Federal sources.

The practical value of intentions-to-plant reports as part of the cooperative extension program is indicated by a recent survey which showed that for most crops the reported intentions are an accurate indication of farmers' plans at the time they report. In 1926, for example, Maryland tobacco growers indicated an intention to increase their acreage 20 per cent. The danger of such an increase was pointed out to these growers with the result that the acreage was increased only 3 per cent and the favorable prices of 1925 were maintained through 1926.

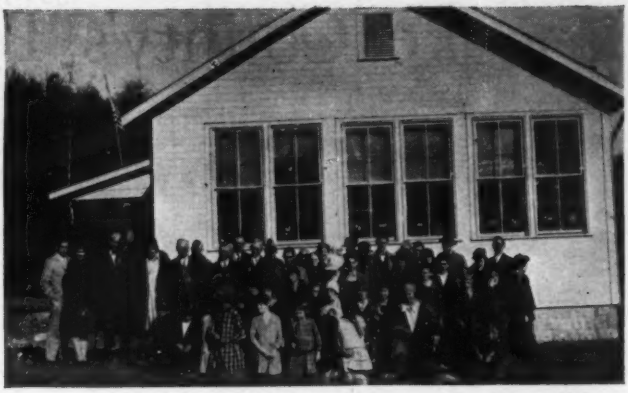
The following year the tobacco growers in the Connecticut Valley indicated an intention to increase the acreage by 12 per cent. Reasons why so large an increase was inadvisable were explained and the acreage was increased only 8 per cent, resulting in slightly improved prices. In the same year, growers of cigar tobacco in the Miami Valley of Ohio and Indiana reported an intention to decrease the acreage 8 per cent. Their situation was such as to call for an even greater reduction, with the result that the acreage was reduced 27 per cent. A crop of high quality was produced and prices were nearly double those of the preceding year.

Gives Warnings

Potato growers were warned in January, 1928, that the indications were for a substantial increase in acreage and those who were planning to expand their acreage because of profits secured during the preceding three

(*Turn to page* 50)

Local pride and community spirit built this fine community hall and school back in the hills of West Virginia. It is probably the only building of its kind in the State, and owes its existence to an excellent feeling of cooperation which exists throughout Cabell County.



Cabell Cooperates

By F. N. Darling

County Agent, Cabell County, West Virginia

COOPERATION is the keynote of agricultural activities in Cabell county, West Virginia.

Demonstrating the new possibilities of cooperation between local community organizations and district and county officials, Walnut Grove community, situated way back in the hills on a dirt road in Cabell county, recently dedicated its new community hall and two-room graded school building. This building, 28x60 feet, built at a cost of $4,000, stands as a monument to the efforts of the Walnut Grove community council, which under the leadership of its chairman, U. S. Williams, started a movement about two years ago for a new graded school. The council proposed to the Union District Board of Education that the building be constructed so that it would serve both as a school and a community house.

Impressed by the reasonableness of the proposal, the board followed the suggestion of the council, and today the building is a fulfillment of the dreams of the community leaders. Two folding partitions divide the building into two classrooms and a hallway, or permit it to be thrown together into one large community hall as needed. Probably no other building of the kind exists in the state at this time.

Three years ago, Walnut Grove school with a score of 29, ranked next to the lowest of all the rural schools in Cabell county. The new score of 87, just given it, puts the school at the top of the list. In the exercises dedicating the new building, James Reinhardt, professor of rural education in the Morris Harvey College contrasted the differences of yesterday with those of today, and pointed out that the community was building for the future. Morris Bailey, vice-chairman of the agricultural committee of the Huntington Chamber of Commerce, stressed the importance of closer cooperation between town and country groups, and pledged the cooperation of the Huntington business men in helping to bring this about.

Another Example

The community obtained the promise of the county court to grade the grounds and plans were made to have

(*Turn to page 59*)

Lonoke County's Program

By John P. Bell

Assistant Agricultural Editor, University of Arkansas

A 600-POUND application of 8-6-8 fertilizer gave a yield of 1,821 pounds of seed cotton in Lonoke county, Arkansas, while an equal amount of 8-6-0 yielded only 1,191 pounds. This is the result of one of the numerous demonstrations established by J. E. Terry, county agricultural agent, in order to establish substantial, local evidence for the need of larger amounts of potash on soil subject to rust, which is one of several soil problems of the county.

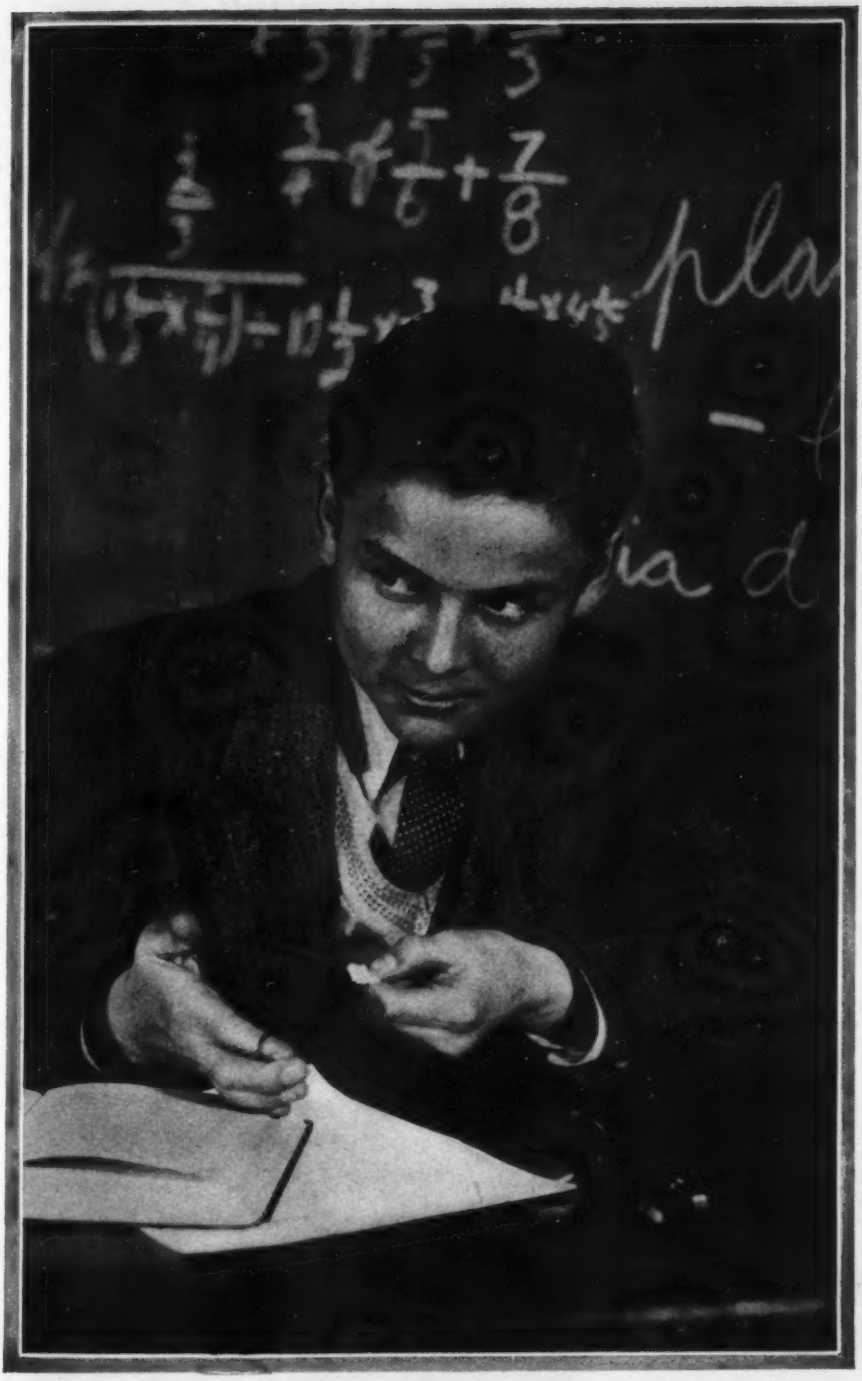
"There is an unusually large acreage in Lonoke county that is subject to rust, and a great many of our farmers have experienced low yields even when using complete commercial fertilizers. Our potash demonstrations have certainly brought out the importance of potash in offsetting the damaging effect of rust on cotton yield. The ready-mixed commercial fertilizers commonly used do not contain sufficient potash, and, consequently, it has been necessary for us to stress that sufficient potash be employed to stop the rust losses at the usual rate of application per acre.

"All of the work done with fertilizers has been done with the idea of establishing the use of better balanced fertilizers. On all our soil, excepting the heavy 'buck-shot' land, we must use a complete fertilizer and one with more nitrogen and potash than the rates used in the past. Where we brought in one car of kainit and one car of nitrate of soda a few years ago, we are bringing in three. This increase is directly traceable to the demonstrations that have been carried on during the last few years. This wiser use of fertilizers has brought about a decreased cotton acreage, an improved cotton yield, and more land in feed crops," Mr. Terry stated.

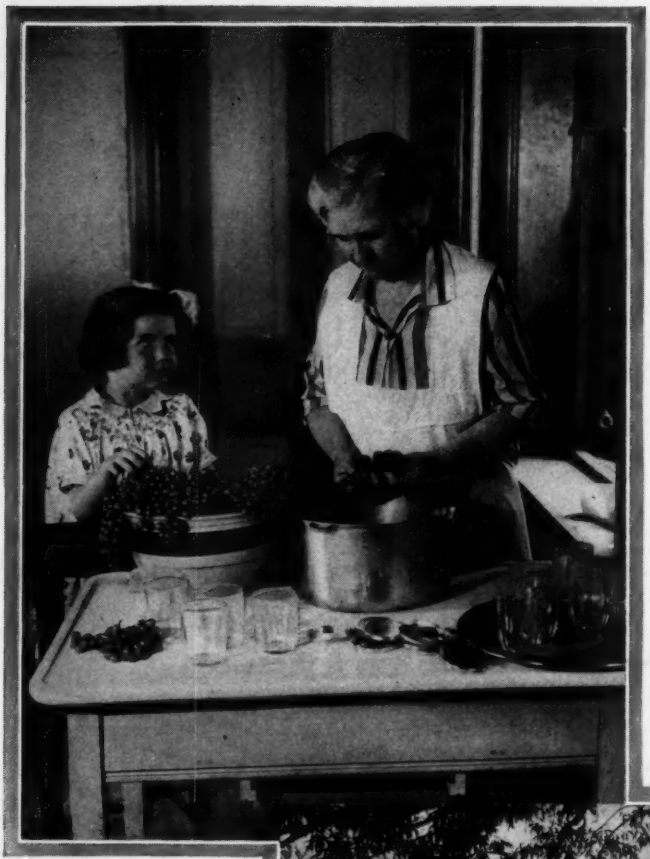
A demonstration with A. A. Cantrell, Sr., of England, using 200 pounds of nitrate of soda as a side-dressing, gave an increase of 550 pounds of seed cotton. In a demonstration on the Armstrong Plantation, of Kerr, Arkansas, 100 pounds of sulphate of ammonia were used as a side-dressing on cotton that had 400 pounds of 10-4-4 under it. The two acres that had only the 10-4-4 made 2,405 pounds of cotton and the two acres side-dressed with the ammonia made 2,803 pounds of seed cotton. The sulphate of ammonia was put on at the second chopping.

Another soil problem confronting Terry is the foulness and low productivity of the rice lands. The low production is caused by the repeated cropping of rice. Carelessness as to the source of seed and to cultural methods has brought about the foulness of fields with red rice, other grasses, and sedges. A program of control was started in 1925 by using soybeans in rotation, planting the beans in drill so as to allow cultivation. As a result the rice crop is of better quality and the yield improved 15 to 20 bushels. Soybean acreage has grown from 3 acres in 1924 to 3,000 in 1928.

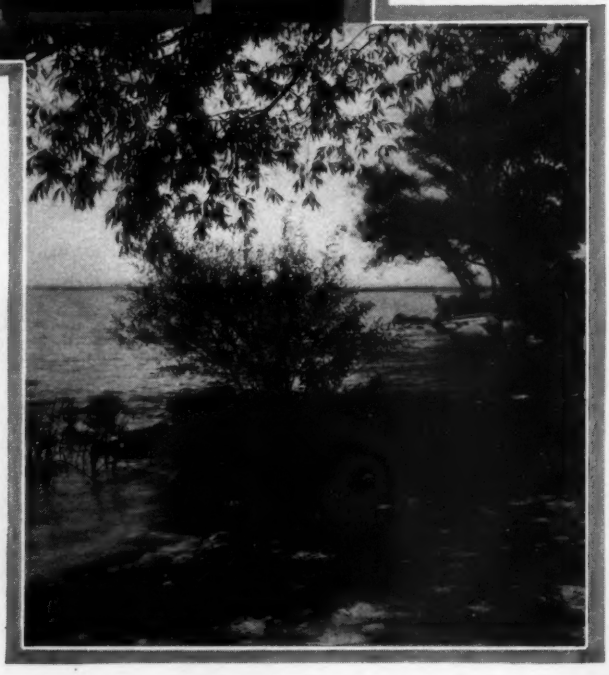
But in this long-time program of soil building Terry has by no means overlooked developing legume growing and livestock. In summing up his work in soil improvement he has stressed first, good dairy cattle; second, legume growing for soil building and feed; and third, the intelligent use of high-grade fertilizers.



Back to Work



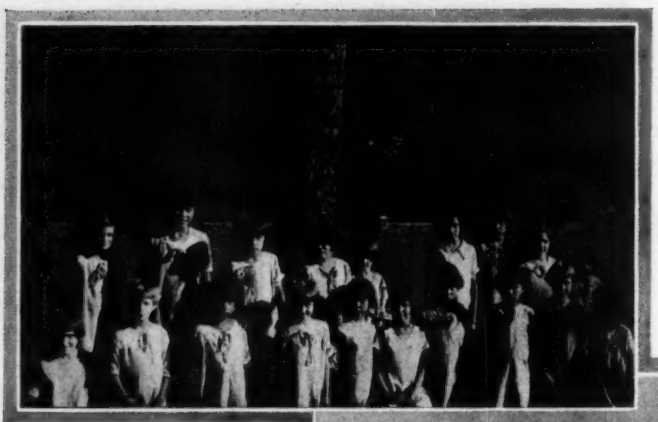
Left: The "helper" seems to be more worried about the securing, rather than the preserving quality, of the fruit she is "canning."



Right: The shores of Lake Mendota, Madison, Wisconsin, although frequented by thousands of students and tourists, maintain their natural beauty.

Right: Roadside marketing has become well recognized as an important phase of marketing agricultural produce.

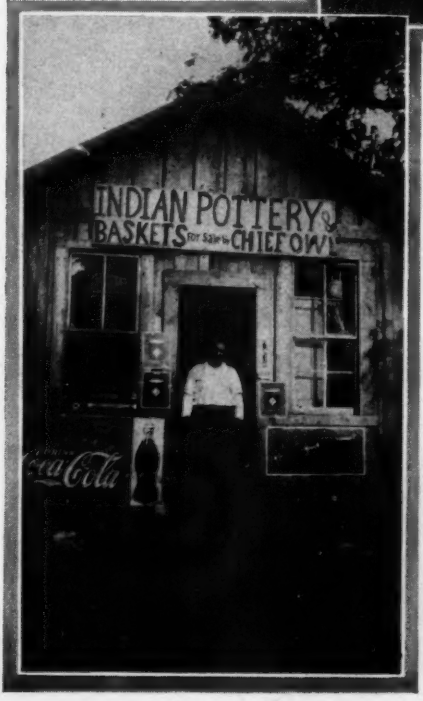
Left: "Frozen." This one-year-old pup stood a wounded pheasant and never moved so much as his eye while the hunter took the picture and kicked out the bird.



Left: Many of this group of Cherokee Indian children have white blood in their veins, but they delight in the fact that they are Indians.

Right: Nestled in the Smoky Mountains of North Carolina, the Cherokee Indian School is modern in its equipment and teaching.

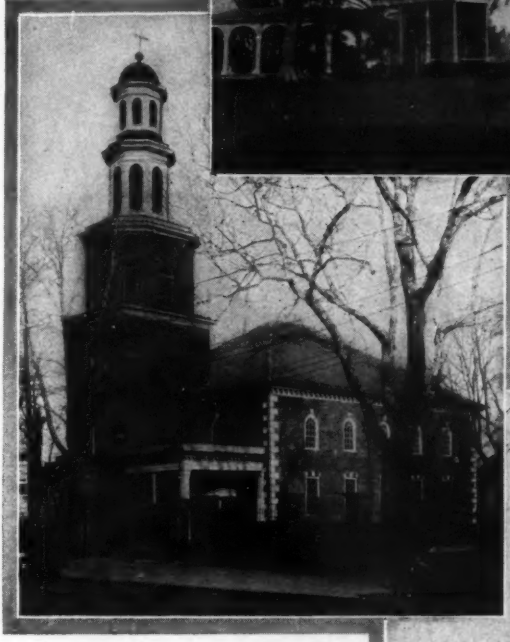
Below: A son-in-law of Chief Owl is standing in the door of this store on the Reservation.



The Cherokees living in the Smoky Mountains of North Carolina are a remnant of the tribe that hid in the mountains at the time the Government attempted to remove them to the Indian Territory. There were several hundred of them. Later the Government decided to leave them there and set aside a tract of land amounting to something like 80,000 acres for their use. These Indians now number more than 3,000.

They cultivate small plots of ground where it is not too steep and make baskets and trinkets for sale. The school at Cherokee, N. C., is a Government institution; their food, clothing, housing, books, in fact all expenses are met by the Government. The children are taught up to the ninth grade. Most of the instructors are Whites, although Indians hold a few minor positions.

Right: Mount Vernon is the goal of the Mount Vernon Memorial Highway which the Government is to build along the Potomac from Washington, D. C., to Mount Vernon.

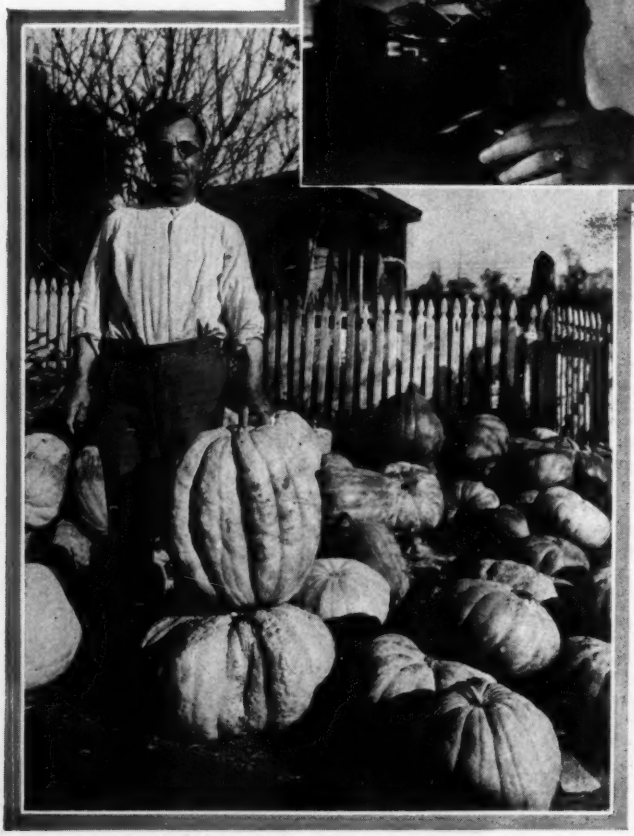


Left: In old Christ Church at Alexandria, Virginia, the Washington pew may still be seen. The Highway will pass through historical Alexandria.

Right: The old quarters of the volunteer fire company in Alexandria to which Washington belonged. Alexandria was George Washington's home town. It was his market place, his post-office, and his voting place. It was the meeting place of a lodge of Masons to which he belonged and the lodge hall is now the repository of a great many articles and paintings associated with him.

The Mount Vernon Memorial Highway is to be built in celebration of the 200th anniversary of the birth of Washington. Congress has authorized an appropriation of $4,500,000 for the road, which is to be completed in 1932 and will be 15.4 miles long.

Right: More and more, women are demonstrating that they are well adapted to many lines of scientific research work: Mrs. Ruth C. Starrett is an assistant cytologist in the office of sugar plants, Bureau of Plant Industry, United States Department of Agriculture. A cytologist knows about the constitution and functions of cells.



Left: Showing that a pumpkin has its own ideas on "physical culture." This great variety of shapes was assembled from one field by this Maryland farmer.

The Editors Talk

Our Changing Diet

We are indebted to Dr. O. E. Baker, Senior Agricultural Economist, Division of Land Economics, United States Department of Agriculture, for some exceedingly interesting data on the changes occurring in the diet of the American people. It will surprise many to know that in spite of the popular craze for slender figures, we are eating more sugar and more pork. Others will find it hard to believe that wheat, the "staff of life," and other cereals are losing ground to fruit and vegetables. And what will the harkers on the high cost of living say to the fact that the diet of the period 1922-1926 is much more expensive in character than in any previous period in the nation's history?

Mr. Baker cannot always give reasons for the changes, but he reports the facts. For instance, of wheat he says, "Whatever the cause, the fact remains that wheat bread, which to many, perhaps most, peoples of the world is a luxury, has occupied a place of lesser importance in the diet of the American people during and since the World War, while the per capital consumption of the more expensive foods has increased."

On the other hand he attributes the 60 per cent decrease in the use of corn for human food to a rising standard of living and the increasing use of wheat flour and other foods by both negroes and whites in the South, where corn has been used for human food more extensively than elsewhere, and to the increasing proportion of the people who live in the cities, where little corn bread is baked in homes and even less by bakers.

In summarizing the changes in the consumption of plant foodstuffs, Mr. Baker says that the per capita consumption of the cereals, except rice, has decreased during the past quarter of a century, especially during and since the World War. Comparing the periods 1897-1902 with 1922-1927, which are 25 years apart, the per capita consumption of wheat flour has decreased over 20 per cent, of corn for food over 60 per cent, of rye flour about 60 per cent, and of barley, used to manufacture beer and similar products, nearly 90 per cent. But the consumption of oatmeal, which is small, probably has remained about stationary. Similarly the consumption of potatoes per capita, excluding the first period, 1897-1902, has remained stationary, and the per capita consumption of fruits is now about the same as a quarter century ago. There has been, however, a notable shift from apples toward citrus fruits and grapes.

Only the vegetables and sugar among the major plant foodstuffs show an increase. The increase in consumption of vegetables is practically confined to the years since the World War, but the increase in consumption of sugar has been almost continuous for a century. However, the most rapid increase has occurred since the World War.

What are the people eating to make up for this decline in consumption of cereal foods?

Mr. Baker finds that we are eating more milk and pork and less mutton,

including lamb, and beef, including veal.

The trend in per capita consumption of animal products was downward from the beginning of the century to the period just before the war (1912-1916) for beef and veal, considered jointly, and for milk, the trend was downward to the war and post-war years (1917-1919) for pork and chickens, and to 1922 for mutton and lamb. Since the war the trend for milk has been upward, for pork it was upward from1917 to 1924, for beef from 1921 to 1924, and for mutton and lamb from 1922-1926. At present the per capita consumption of beef and veal, considered jointly, and of eggs, is about the same as at the beginning of the century; the consumption of mutton and lamb, considered jointly, is much less, and of chickens also; whereas the consumption of pork is now about 10 per cent greater and of milk about 12 per cent greater. It is worth noting that the hog and the dairy cow among all farm animals produce the most human food per unit of feed consumed.

Applying the changes to the agricultural situation, Mr. Baker says that the importance of this more expensive diet in mitigating the agricultural depression will be better realized when it is noted that foodstuffs constitute about seven-eights of the total consumption of agricultural products. If the prosperity of the non-farm people, who now constitute three-fourths of the nation's population, should decline, and the per capita consumption of agricultural commodities gradually return to the former proportions, that is, if a reverse trend toward less meat and milk and more cereal foods set in, the reaction on agriculture would become increasingly serious. It is certain that no change in diet would be of benefit to so large a proportion of the farmers of the United States as a further increase in the consumption of animal products.

Handful Proof

When we hear of a farmer who discredits the use of fertilizer because he tried some and it didn't do his crops any good, we are reminded of the tale of the old Indian chief and the feathers. It seems that the old chief was getting so stiff and rheumatic that he couldn't sleep. His friends told him that the paleface cure was to sleep on feathers, and so he collected a large handful of feathers, carefully put them on a long flat rock, and lay down to pleasant dreams. When he awoke in the morning, he rubbed his lame back and said, "White man say feathers soft; white men tell big lie!"

The chances are that the man who is "all through" with fertilizer is basing his opinions on handful proof. Perhaps he did apply enough, but not in accordance with the needs of his soil. Perhaps his soil didn't need it, but that doesn't mean that the recommendations of scientific agriculturists, which might apply to his neighbor's soil deficient in fertility, are lies.

In this day and age, we need more than handful proof for our recommendations and decisions. Fertilizer recommendations are based on years of careful study and experimentation. Careful checks are made, and experiments are run oftentimes for many years before definite information is given out. In the face of such evidence, the statement of a disgruntled farmer deserves no more attention than the old Indian chief's accusation against the paleface feathers.

The Greatest of Them All

For a long time we have held in our "treasure file" a clipping of a little editorial which appeared in the *Prairie Farmer* in 1925. We liked the thought of this bit of writing which called the farmer the greatest of all human creators.

To us who love the country, the picture of farm life is never more beautiful or complete than in the approaching season—Fall. The harvest is over, and as if to enhance the fulfillment of man's effort, Nature paints her foliage with a riot of color. We find it easiest then to tie up with the stern realities of the business side of farming the sheer beauty and satisfaction of country life.

THE GREATEST OF THEM ALL

The noblest human art is the art of self expression. We are all creators, and within us is the urge to create something enduring and worth while. The world honors its great sculptors, who carve a granite block into a thing of beauty. It honors its great painters, who spread upon a canvas a painting so beautiful that it holds us spellbound.

Yet no artist paints with the bold strokes of the farmer, whose canvas is a quarter section of land. On that he paints the dark green of the cornfields and the yellow of the wheat and oats. If the picture is well done, the yellow will be in the grain fields instead of in the corn, and there will be no weedy or unproductive corners to spoil the beauty of the whole.

The farmer is the greatest of all human creators. His tools are life itself, which he molds to his own purpose—that of making his farm produce more bountifully to the feeding of the nation. In him is found the highest development of the art of self expression. The whole farm is an expression of his ambition and his life.

Some people can read character in faces. We can all read character in farms. The farm which is the expression of a well-rounded man tells its story in the fields, in the barns, and most of all in the home, for after all farming is a life rather than a business, and its best products are its boys and girls.—*Prairie Farmer.*

More Plant Food Per Ton

Recent data on mixed fertilizers sold in Ohio and Pennsylvania show that the average amount of plant food per ton of fertilizer in 1928 was higher than in any preceding year. Ohio farmers in 1928 bought approximately 20 per cent more plant food per ton than in 1922. In Pennsylvania farmers secured 28,281 tons more of plant food in 1927 than in 1925, even though the total fertilizer tonnage was 1,948 tons less. Available 1928 figures show a continuation of this trend.

Many of the items of cost in the retail price of mixed fertilizers to farmers are ton costs, i. e., freight, bagging, handling, and storage charges are so much per ton. This means that if a ton of fertilizer contains a large amount of plant food, the cost per unit is lower than in a grade of fertilizer which contains a comparatively smaller amount of plant food per ton. This difference in the cost of plant food has been one of the factors which has led farmers

to buy high analysis fertilizers, as it enables the consumer to save on freight and handling costs.

With wages relatively high as compared with other commodities, it is probable that this trend toward high analysis will continue.

Luncheons for Alumni

Last month, on these pages, we commented upon alumni picnics. We are now in receipt of a nice letter from C. Hohn, Agricultural Agent of Washington county, Texas, advising us the method for getting together employed by alumni in that state.

"Being a college man," Mr. Hohn says, "I read with much interest the method that is being used by the alumni of Purdue University in keeping in touch with each other by their annual picnic.

"The ex-students and alumni of the A. & M. College of Texas have a rather novel plan of keeping in touch with each other. In eleven of the larger cities of Texas they have a weekly luncheon club where they meet every week for an hour and a half. In forty-two of the smaller towns they lunch at night once a month, and at each one of these places they hold their annual picnic on the Fourth of July each year.

"I feel that these luncheon clubs are worth a great deal to the school and to the betterment of education, because it gives the students and ex-students an opportunity to do some real beneficial educational work. It is certainly a pleasure to know that lots of colleges are following similar plans."

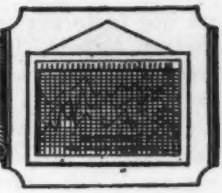
Perhaps there are other means employed by alumni in other sections of the country. If so, we would be glad to hear of them.

"Be patient with the boys. You are dealing with soul-stuff. Destiny waits just around the corner. Boys evolve into men, and men sometimes change boundary lines of states. They make political parties, they crown kings, and they put them to flight. They bring contention or they make peace. They may build or they may destroy.

"But boys misused, abused, betrayed, never forget and seldom forgive. It is a terrible thing to plant the germs of suspicion and hate in the mind of a child.

"The hope of the race lies with the boys. In a year or two we will be going to hear them preach from pulpits; we may go to them to borrow money; they may operate on us for appendicitis—aye, they may preach our funeral sermons. Nobody can prophesy the success to which a boy will attain. Difficulty, trial, hardship, these are the things that evolve boys into men. Boys can be led. They cannot be driven. Be patient with the the boys. You are dealing with soul-stuff. Destiny awaits around the corner."—ELBERT HUBBARD.

AGRICULTURAL DEVELOPMENTS



By P. M. Farmer

THE LIFE OF A FARM MACHINE

The farm wagon lives the longest, and the spring-tooth harrow has the shortest life of all the farm machines. These facts are the result of a study by agricultural engineers of Iowa State College. They found that farm machines of all kinds on the average last 15 years. The wagons on the average last 24 years, while the spring-tooth harrow is in service 8 years. Grain binders varied in length of life from 5 to 33 years, with an average of 16. The average machine in the survey was used only 16 days a year, with variations from 4 days for the seeder to 80 days for the wagon and gasoline engine. A big factor in the cost of service was the number of days of use. The average cost of one day's service varied from 8 cents for a one-row cultivator to $10.11 for an ensilage cutter. It was found that failure to house the machinery did not appreciably shorten the life of the machines. Nevertheless, the engineers recommend housing machines. There are savings in time and gains in efficiency—and appearance counts.

FEED SHEAF OATS—SAVE MONEY

Many Illinois farmers and cattle feeders are cutting costs by feeding sheaf oats. E. T. Robbins of the College of Agriculture of that State says this is much more economical than feeding the threshed grain in the feed box and the straw in the manger. The College uses this once common method in feeding horses and colts. Cattlemen like the method, especially for stock cattle and calves and for starting cattle on feed. At the College they solve the rat and mouse problem by leaving a little space between the sheaf oats and the barn wall or any other straw or hay. They scatter hydrated lime on the sheaves as they are stored away. About 7 or 8 pounds of the lime is used for each ton of the sheaves. The lime shakes off during handling and does no harm to the stock.

NATION GETTING GULLY CONSCIOUS

It has taken a good deal of rain to call the country's attention to the need to fight soil erosion, but now finally the campaign against the gully washer is going with considerable momentum. S. H. McCrory, chief of the division of agricultural engineering of the U. S. Department of Agriculture, recently brought out that last year soil-saving terraces and dams were constructed on more than 45,000 farms, and that estimates show erosion was prevented on more than 1,349,000 acres. The cost was $5 to $10 an acre. Of the 31 States in which work was done to control erosion, Texas was in the lead with 574,000 acres terraced, Mississippi second with 155,000 acres protected, and Alabama third with 151,000 acres. McCrory says farmers in the northern and midwestern States

are just beginning to realize the losses they are suffering from this cause. In one year an area equal to more than twice the area of Rhode Island has been fortified against this waste of soil, but Mr. McCrory says progress is not nearly fast enough in view of the hundreds of millions of acres in need of improvement.

COPPER FOR PIGS

Some time ago one of the experiment stations reported finding that one of the reasons a liver diet was effective in curing anaemia was that liver contains considerable copper. Now John Evvard, famous experimentalist on animal nutrition at Iowa State College, says that a little copper in the diet of the pig increased gains and kept him healthier—kept him from becoming anaemic. He fed the copper in the form of sulphate or bluestone. It is said that copper does not really become a part of the blood, but is a stimulator, a catalyst, which helps along chemical reactions in much the same way that a policeman, another sort of "copper," keeps traffic moving.

HUNTING HARDY FRUITS

A group of plant hunters are searching wild country about Hudson's Bay this summer for superhardy fruits that may be useful in making fruits of our northern States more resistant to the hard winters. The object is to find wild raspberries, grapes, and other fruits that will provide this necessary element to be added to the quality of fruit already obtained by the plant breeders. In the group making the six-weeks trip are Dr. Knowles A. Ryerson, U. S. Department of Agriculture, Prof. W. H. Alderman, University of Minnesota, W. A. Leslie, Dominion Experimental Farm, Morden, Man., B. W. Jackson, Manitoba Agricultural College, and Dr. E. W. Montgomery, a physician of Winnipeg who has been much interested in developing hardy fruits for the north country. These men have promised themselves they will not be satisfied with any ordinary hardiness. They want plants that will hold a flower under Jack Frost's chin to see if he "likes butter."

TO A MOUSE

Wee, sleekit, cowrin' beastie,
Oh, what a panic's in thy breastie!

When Burns was inspired to write these lines to a meadow mouse, he was a farmer—but he was more poet than farmer. Also, at that time it is probable there were no available figures on what the mouse was doing to the income of the farm. Now there are figures, and the panic is probably in the breast of the farmer. Vernon Bailey of the U. S. Department of Agriculture says a meadow mouse eats a bit more than an ounce of green feed every day—23 pounds a year. Mr. Bailey says a hundred mice to an acre is not at all unusual, and in years particularly favorable to mice there may be as many as 1,000 to the acre. Well, just a hundred would eat a ton of green clover, and on a hundred acres that's a hundred tons, equal to about 50 tons of hay. Fortunately we have animals, birds, and parasites that help us keep the mice from taking the whole crop.

SIMPLE WHEAT HARVEST METHOD

Thomas Campbell of Hardin, Montana, famous for his large-scale grain farming and once prominently mentioned as a possibility for the Secretaryship of Agriculture in President Hoover's cabinet, is given credit for a short-cut method of harvesting wheat that is now being taken up in Nebraska. He used an arrangement of machines which windrowed the grain, then picked up the windrow and fed it into a threshing machine which poured the threshed grain into wagons.

Automobiles in India

By J. J. De Valois

Agricultural Missionary, Katpadi, South India

THE searchlight of the world has been turned on India during recent years. People in America have heard a great deal about India's poor economic position. Some critics seem to consider her position as quite hopeless.

There is another side to the story however, as evidenced by the growth in the automobile industry in this country within the last few years. The motor car and truck seem to be a fairly accurate means of judging the progress of any nation. Improved roads, better communication, less isolation, more adequate marketing facilities are only a few of the many advantages the automobile brings to rural people.

The Indian automobile trade has grown very rapidly during the last few years. The number of cars imported in 1926 was 12,757, as compared with only 2,895 in 1922.

In this connection, it is interesting to note that the cost of cars in India is about double the cost of the same make of cars in America. English cars are even more expensive than American or Indian cars. Gasoline, called petrol in India, sells for 40c an imperial gallon. The imperial gallon is slightly larger than the gallon measure used in America, but still the price is about double.

India and the tropical countries produce the world's rubber, consequently, tires should be cheap. This, however, is not true, because the raw rubber is exported for manufacture and a 15 per cent duty awaits the arrival of the rubber tire when it returns to serve its mother country. The intense heat seems to have a disintegrating effect on the life of tires, and tires run under the tropical sun soon become so hot that a person cannot hold his hand on them. Only 5,000 or 6,000 miles can be expected from tires. Guarantees and records of

The draft animal of India, the bullock, must be thrown to be shod.

25,000 to 30,000 miles in America hold little consolation for the tropical tourist.

In spite of all these handicaps and difficulties, the motor trade is growing and developing rapidly. It doubled itself five times over in the last four years. The greatest increase is to be noted in motor buses and public conveyances. The large majority of people in India are not in a position to afford their own private cars, but do appreciate the advantages of the motor bus service. All over India today, the motor car conveyances are rapidly replacing the Indian jutka pony and two-wheeled cart, and the even more antique and slow-moving bullock cart. India is rapidly developing a network of connecting lines and buses between strategic railway centers. It is doing a great deal also to bring the isolated villages and smaller cities into closer touch with the outside world.

India, with its 320,000,000 people, has been recognized as a very important market for this modern form of conveyance. Railroads have not been as thoroughly developed as in many American and European countries and the chances are that they never will have to face the conditions that the railroad authorities are facing in America today, namely, a keen competition between the automobile and motor truck. The British government has introduced the trunk line in its railroad system, but the branch and connecting lines are not yet developed. This is one of the chief contributing factors in the rapid growth of the motor truck conveyance. Even the motor truck is taking an ever-increasing share of the freight that is carried from point to point. The bullock cart caravans are on the decrease, as India is moving forward so rapidly in her adoption of mechanical devices.

The announcement that certain motor car companies will commence active operation in assembling motor cars in their own factories in India was welcomed most heartily by Indian Nationalists and friends interested in the progress of this great peninsula. This new development will provide employment for several hundreds of Indian workmen at good wages. Many economists feel that the pressure of

(*Turn to page* 49)

The much abused and neglected jutka pony is rapidly being pushed off the main thoroughfare by the motor car and bus service.

REVIEWS

This section contains a short review of some of the most practical and important bulletins, and lists all recent publications of the United States Department of Agriculture and the State Experiment Stations relating to Soils, Fertilizers, Economics, Crops, Crop Diseases, and Insects. A file of this department of BETTER CROPS WITH PLANT FOOD would provide a complete index covering all publications from these sources on the particular subjects named.

Fertilizers

Sources of nitrogen, phosphorus, and potash, as well as amounts per acre, are of greatest importance in the profitable production of tobacco. An exhaustive study of sources of the essential plant food elements for bright tobacco is to be found in Technical Bulletin No. 35 of the Virginia Agricultural Experiment Station. The authors, T. B. Hutcheson and T. L. Copley, briefly summarize their studies as follows: "A satisfactory fertilizer for bright tobacco may be made by obtaining three-fourths of its nitrogen from high-grade inorganic materials and one-fourth from high-grade organic materials; its phosphorus from superphosphate; and its potash, two per cent from muriate and the remainder from high-grade potash salts which contain no chlorine." The basic treatment in the studies recorded in this bulletin was 1,000 pounds per acre of a 3-8-3 analysis. Teachers, county agents, as well as tobacco growers, will find much interesting information in this bulletin.

An interesting discussion of concentrated fertilizers versus standard analyses is recorded in Bulletin 350 of the Maine Experiment Station. The title of the bulletin is "Concentrated Fertilizers for Potatoes in Aroostook County." The main conclusions of the authors, B. E. Brown, Biochemist, U. S. Department of Agriculture, and F. V. Owen, Maine Experiment Station, are that the concentrated mixtures offer important economic advantages where saving in shipping and handling are factors; uniformly good results were obtained with concentrated fertilizers when compared with ordinary strength fertilizers when fertilizers were properly applied; changes in fertilizer distribution may become necessary for effective distribution of the concentrated mixtures; physical condition of the concentrated mixtures at present constitutes one of the greatest hindrances to their use.

"New Fertilizer Materials and Their Uses" is the subject of a paper presented by J. J. Skinner, Biochemist, U. S. Department of Agriculture, at the Fertilizer Short Course, North Carolina Agricultural College and published as Agronomy Circular No. 22 of that station. The limitation of the use of concentrated mixtures is summarized as follows: It is believed that the highly concentrated salts adaptable to fertilizer usage will gradually be used more and more in conjunction with ordinary fertilizers so that each supplements the other. To assure mixtures of sufficient concentration, possessing good mechanical condition and which can be applied without injury to crops, precludes the possibility of having mixtures of very high concentration. There should be a practical compromise on mixtures not of extreme concentration, yet considerably more concentrated than the average commercial fertilizer.

"Fertilizer Ratio Experiments," Agr. Exp. Sta., Experiment, Ga., Bul. 151, Jan., 1929, R. P. Bledsoe and J. J. Skinner.

"Choosing a Commercial Fertilizer," Agr. Exp. Sta., Columbia, Mo., Cir. 221, March, 1929, M. F. Miller.

"Effects of Synthetic Nitrogen and Concentrated Fertilizers on Cotton and Sweet Potatoes," Agr. Exp. Sta., Raleigh, N. C., Bul. 266, May, 1929, J. J. Skinner, C. B. Williams, and H. B. Mann.

"The Quality and Yield of Cotton as Influenced by Fertilizers and Soil Type." Agr. Exp. Sta., Raleigh, N. C., Agron. Inf. Cir. 21, Jan., 1929, J. J. Skinner.

"The Use of the Standard Ratio Fertilizers for Field Crops on Ohio Soils," Agr. Exp. Sta., Columbus, Ohio.

"Fertilizers for Vegetable Crops on Ohio Soils," Agr. Ext. Service, Columbus, Ohio.

Soils

Corn, the King of Crops in the Midwest, has in the past received very little attention with regard to its fertilizer need. The Michigan State College in Extension Bulletin No. 70 comes to the rescue with practical information based on years of carefully conducted experimental work. The author, M. M. McCool, emphasizes particularly the importance of fertilizers as they affect yields, maturity, frost resistance, and profits. Still another important consideration mentioned is the tendency of potash deficiency to increase as the soils continue to be farmed. This bulletin has a place in the working library of every teacher and farmer.

"Plant and Soil Relations at and Below the Wilting Percentage," Agr. Exp. Sta., Tucson, Ariz., Tech. Bul. 25, Feb. 1, 1929, O. C. Magistad and J. F. Breazeale.

"Magnesium and Calcium in Zeolitic Soils," Agr. Exp. Sta., Tucson, Ariz., Tech. Bul. 26, May 10, 1929, J. F. Breazeale.

"Soil Report No. 41—Henry County Soils," Agr. Exp. Sta., Urbana, Ill., Oct., 1928, R. S. Smith, E. E. DeTurk, F. C. Bauer, and L. H. Smith.

"Soil Report No. 42—Morgan County Soils," Agr. Exp. Sta., Urbana, Ill., Feb., 1929, R. S. Smith, E. E. DeTurk, F. C. Bauer, and L. H. Smith.

"Organic Matter in Berrien County Soils," Agr. Exp. Sta., East Lansing, Mich., Cir. Bul. 108, Jan., 1929, M. M. McCool and J. O. Veatch.

"Organic Matter in Ingham County Soils," Agr. Exp. Sta., East Lansing, Mich., Cir. Bul. 109, Reprint May, 1929, M. M. McCool and J. O. Veatch.

"Organic Matter in Kalamazoo County Soils," Agr. Exp. Sta., East Lansing, Mich., Cir. Bul. 110, Jan., 1929, M. M. McCool and J. O. Veatch.

"Organic Matter in Ottawa County Soils," Agr. Exp. Sta., East Lansing, Mich., Cir. Bul. 111, Jan., 1929, M. M. McCool and J. O. Veatch.

"Organic Matter in Van Buren County Soils," Agr. Exp. Sta., East Lansing, Mich., Cir. Bul. 112, Jan., 1929, M. M. McCool and J. O. Veatch.

"Organic Matter in Calhoun County Soils," Agr. Exp. Sta., East Lansing, Mich., Cir. Bul. 113, Jan., 1929, M. M. McCool and J. O. Veatch.

"Organic Matter in Livingston County Soils," Agr. Exp. Sta., East Lansing, Mich., Cir. Bul. 114, Jan., 1929, M. M. McCool and J. O. Veatch.

"Organic Matter in Hillsdale County Soils," Agr. Exp. Sta., East Lansing, Mich., Cir. Bul. 115, Reprint May, 1929, M. M. McCool and J. O. Veatch.

"Organic Matter in Macomb County Soils," Agr. Exp. Sta., East Lansing, Mich., Cir. Bul. 116, Jan., 1929, M. M. McCool and J. O. Veatch.

"Distribution of Acid Soils, Muskegon County," Agr. Exp. Sta., East Lansing, Mich., Cir. Bul. 117, Jan., 1929, J. O. Veatch.

"Distribution of Acid Soils, Jackson County," Agr. Exp. Sta., East Lansing, Mich., Cir. Bul. 118, Jan., 1929, J. O. Veatch.

"Distribution of Acid Soils, Hillsdale County," Agr. Exp. Sta., East Lansing, Mich., Cir. Bul. 119, Reprint May, 1929, J. O. Veatch.

"Distribution of Acid Soils, Ingham County," Agr. Exp. Sta., East Lansing, Mich., Cir. Bul. 120, Reprint May, 1929, J. O. Veatch.

"Distribution of Acid Soils, Kent County," Agr. Exp. Sta., East Lansing, Mich., Cir. Bul. 121, Jan., 1929, J. O. Veatch.

"Distribution of Acid Soils, Tuscola County," Agr. Exp. Sta., East Lansing, Mich., Cir. Bul. 122. Jan., 1929, J. O. Veatch.

"The Soils of Michigan—Grayling Sand," Agr. Exp. Sta., East Lansing, Mich., Spec. Bul. 180, Jan., 1929, M. M. McCool and A. G. Weidemann.

"Meaning and Use of Willamette Soil Survey," Agr. Exp. Sta., Corvallis, Ore., Sta. Cir. 90, Dec., 1928, E. F. Torgerson and W. L. Powers.

"Methods for Determining the Hydrogenion Concentration of Soils," U. S. D. A. Washington, D. C., Cir. 56, Dec., 1928, E. F. Snyder.

Crops

In Circular 158, "The Culture of Onions in Indiana," issued by the Purdue Agricultural Experimental Station, H. D. Brown, the author, has considered all of the important factors in the production of this crop for which

Indiana is well known. Plant food is an important element in the realization of profit on this crop, and the author has discussed quite fully the better practices of fertlization used in the state.

Another bulletin well illustrated and very readable in its content is Special Bulletin 191, "Barley for Michigan Farms," recently published by the Michigan Agricultural Experiment Station. Some fine pointers on success with this grain will be found in the work done by this state as set forth in this publication by H. C. Rather, E. E. Down, H. M. Brown and F. H. Clark.

"Monthly Bulletin of the Department of Agriculture," Sacramento, Cal., Vol. XVIII, No. 6, June, 1929.

"Maturity Standards for Harvesting Bartlett Pears for Eastern Shipment," Agr. Exp. Sta., Berkeley, Cal., Bul. 470, July, 1929, F. W. Allen.

"The Use of Sulfur Dioxide in Shipping Grapes," Agr. Exp. Sta., Berkeley, Cal., Bul. 471, July, 1929, H. E. Jacob.

"The Colorado Experiment Station," Fort Collins, Colo., Press Bul. 67, March, 1929, D. W. Robertson, Alvin Kezer, and G. W. Deming.

"Carbon Disulfide for the Eradication of Perennial Weeds," Agr. Exp. Sta., Fort Collins, Colo., Bul. 347, May, 1929, Chas. F. Rogers and Ira Hatfield.

"Vetch and Austrian Peas for Soil Improvement," Agr. Ext. Div., Gainesville, Fla., Bul. 54, June, 1929, J. Lee Smith.

"Strawberries in Florida," Agr. Exp. Sta., Gainesville, Fla., Bul. 204, May, 1929, A. N. Brooks, J. R. Watson, and Harold Mowry.

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"Inheritance of Kernel Arrangement in Sweet Corn," Agr. Exp. Sta., Urbana, Ill., Bul. 320, W. A. Huelsen and M. C. Gillis.

"Report of the Director for the Year Ending June 30, 1928," Agr. Exp. Sta., Lafayette, Ind., G. I. Christie.

"The Home Vegetable Garden," Ext. Div., Lexington, Ky., Cir. 67 (Revised), Jan., 1929, J. S. Gardner and A. J. Olney.

"Report of the Maryland State Horticultural Society," Baltimore, Md.

"Biennial Report," Agr. Exp. Sta., Amherst, Mass., Bul. 247, Feb., 1929.

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"Growing Lima Beans for the Canning Factory," Mich. State College, East Lansing, Mich., Ext. Bul. 81, March, 1929, Geo. E. Starr.

"Growing String Beans for the Canning Factory," Mich. State College, East Lansing, Mich., Ext. Bul. 82, March, 1929, Geo. E. Starr.

"Growing Peas for the Canning Factory," Mich. State College, East Lansing, Mich., Ext. Bul. 83, March, 1929, Geo. E. Starr.

"Pollination of Orchard Fruits in Michigan," Agr. Exp. Sta., East Lansing, Mich., Spec. Bul. 188, Mch., 1929, Roy E. Marshall, Stanley Johnston, H. D. Hootman, and H. M. Wells.

"Bermuda Onion Culture," Col. of Agr., Columbia, Mo., Cir. 215, Jan., 1929, J. T. Quinn.

"Winter Wheat Tests in New Jersey," Agr. Exp. Sta., New Brunswick, N. J., Bul. 483, May, 1929, Howard B. Sprague and E. E. Evaul.

"Forty-ninth Annual Report," Agr. Exp. Sta., New Brunswick, N. J., and the "Forty-first Annual Report," N. J. Agr. Col. Exp. Sta., J. G. Lipman.

"Almonds," Agr. Exp. Sta., State College, N. M., Bul. 171, Jan., 1929, A. B. Fite.

"Thirty-ninth Annual Report," Agr. Exp. Sta., State College, N. M., Fabian Garcia.

"The Effect of Freezing on the Catalase Activity of Apple Fruits," Agr. Exp. Sta., Ithaca, N. Y., Memoir 122, Mch., 1929, D. B. Carrick.

"Grape Culture in New York," Agr. Exp. Sta., Geneva, N. Y., Cir. 110, Feb. 1, 1929, F. E. Gladwin.

"Red Currants and Gooseberries," Agr. Exp. Sta., Geneva, N. Y., Cir. 112, Apr. 1, 1929, G. L. Slate.

"Fruit Regions and Varieties of Eastern New York," Agr. Exp. Sta., Geneva, N. Y., Bul. 563, Feb., 1929, H. B. Tukey.

"Growing Lespedeza in North Carolina," Col. of Agr., State College Station, Raleigh, N. C., Agronomy Information Circular No. 26, Feb., 1929, E. C. Blair and P. H. Kime.

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"Edgeley Substation, Report for Years 1922 to 1928," Agr. Exp. Sta., Fargo, N. D., Bul. 226, May, 1929, O. A. Thompson.

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"Studies of Factors Influencing Separation of Dried Prunes into Quality Grades," Agr. Exp. Sta., Corvallis, Ore., Sta. Bul. 252, July, 1929, Ernest H. Wiegand and D. E. Bullis.

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"The Insulation of Fruit and Vegetable Storages," Agr. Exp. Sta., State College, Pa., Bul. 241, June, 1929, R. D. Anthony and F. G. Hechler.

"The Farm Orchard," Agr. Col., Clemson College, S. C., Bul. 89, Jan., 1929, A. E. Schilletter.

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"Our Changing Agriculture," Ext. Service, Brookings, S. D., Cir. 278, Dec., 1928, A. E. Anderson.

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"Tennessee Pasture and Alfalfa Hay Plan," Ext. Service, Knoxville, Tenn., Pub. 154, Jan., 1929, J. C. McAmis.

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"Gardening," Ext. Service, College Station, Tex., Bul. B-70, Apr., 1929, J. F. Rosborough and Frank S. Jamison.

"High-Grade Alfalfa Hay," U. S. D. A., Washington, D. C., Farmers' Bul., 1539, Edward C. Parker.

"Frost and the Prevention of Frost Damage," U. S. D. A., Washington, D. C., Farmers' Bul. 1588, Floyd D. Young.

"Leaf Temperatures of Cotton and Their Relation to Transpiration, Varietal Differences, and Yields," U. S. D. A., Washington, D. C., Tech. Bul. 91, Jan., 1929, Frank M. Eaton, Galen O. Belden.

"Extension Methods and their Relative Effectiveness," U. S. D. A., Washington, D. C., Tech. Bul. 106, Feb., 1929, M. C. Wilson.

"Silage Corn Varieties for Utah," Agr. Exp. Sta., Logan, Utah, Bul. 211, June, 1929, George Stewart and A. L. Wilson.

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"Eradicating the Bindweed with Sodium Chlorate," Agr. Exp. Sta., Pullman, Wash., Bul. 235, June, 1929, E. G. Schafer, O. C. Lee, and J. R. Neller.

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"Results with Tree Planting at the Sheridan Field Station," Agr. Exp. Sta., Laramie, Wyo., Bul. 163, Mch., 1929, R. S. Towle.

"Barley Production and Varieties for Wyoming," Agr. Exp. Sta., Laramie, Wyo., Bul. 164, Apr., 1929, Glen Hartman.

Economics

Cornell Memoir 118, "Wheat Prices and the World Wheat Market," is primarily a study of the major effects determining wheat prices in the world wheat market and also in the markets of some of the leading wheat export and wheat importing countries. Liverpool wheat prices were taken as representative of world wheat prices. The changes in the Liverpool prices from spring to fall are closely related to the production in the Northern Hemisphere. Liverpool prices are more closely related to the fluctuations in production in the surplus producing sections of eastern Europe and the deficient area of western Europe than to the production in North America. Wheat prices at the interior markets in the United States are generally more closely correlated with world production than with the interior crop. In Russia, however, the situation was the reverse.

"Economic Phases of the Arkansas Apple Industry," Bul. 236, from the Arkansas Agricultural Experiment Station deals with the economic phase of the apple industry in that state. During the period 1924-7, Arkansas ranked seventeenth among the states in the total production, and twelfth in the volume of carlot shipments. The principal markets for Arkansas apples are in Oklahoma, Texas, Arkansas, and Louisiana, 85 per cent of the carlot shipments being to these states.

"Range Resources of the San Luis Valley," Agr. Exp. Sta., Fort Collins, Colo., Bul. 335, March, 1929, Herbert C. Hanson.

"Proposed Plan Looking Toward Adjustments in the Agriculture of Illinois," Agr. Exp. Sta., Urbana, Ill., Cir. 340, May, 1929, H. W. Mumford.

"An Economic Study of the Production of Sweet Corn and Peas in Maryland," Agr. Exp. Sta., College Park. Md., Bul. 305, March, 1929, S. H. DeVault and Wm. Paul Walker.

"Farm Income and Taxation in North Carolina," Agr. Exp. Sta., Raleigh, N. C., Bul. 267, June, 1929, G. W. Forster, H. W. Hawthorne, G. S. Klemmeason, H. H. Wooten.

"Wheat Situation, Farm Storage, and Feeding Value," Agr. Ext. Div., Agricultural College, Fargo, N. D., Cir. 88. June, 1929, O. M. Fuller.

"The Combined Harvester-Thresher in North Dakota," Agr. Exp. Sta., Fargo, N. D., Bul. 225, May, 1929, Alva H. Benton, et al.

"Managing a Farm in the Corn Borer Area," Agr. Ext. Serv., Columbus, Ohio, Bul. 79, Feb., 1929, Paul E. Johnston.

"Oregon Apple Prices," Agr. Exp. Sta., Corvallis, Ore., Sta. Bul. 244, May, 1929, Ralph S. Besse and M. R. Cooper.

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"Cost and Efficiency in Producing Hay in the Willamette Valley," Agr. Exp. Sta., Corvallis, Ore., Sta. Bul. 248, May, 1929, H. E. Selby.

"Cost of Horse Labor on Oregon Farms," Agr. Exp. Sta., Corvallis, Ore., Sta. Bul. 250, June, 1929, H. E. Selby, B. W. Rodenwold, and H. D. Scudder.

"Cost of Producing Silage and Kale in the Willamette Valley," Agr. Exp. Sta., Corvallis, Ore., Sta. Bul. 251, June, 1929, H. E. Selby.

"Systems of Farming for the Black Waxy Prairie Belt of Texas," Agr. Exp. Sta., College Station, Tex., Bul. 395, May, 1929, L. P. Gabbard, J. B. Hutson, and T. L. Gaston, Jr.

"Cost and Profit in the Sugar Orchard," Agr. Exp. Sta., Burlington, Vt., Bul. 292, Feb., 1929, John A. Hitchcock.

Insects

"The Mediterranean and Other Fruit Flies," Agr. Exp. Sta., Berkeley, Cal., Cir. 315, July, 1929, H. J. Quayle.

"Ants and Their Relation to Aphids," Exp. Sta., Fort Collins, Colo., Bul. 341, Feb., 1929, Chas. R. Jones.

"The Corn Borer Advance in 1928," Col. of Agr., Urbana, Ill., Cir. 334, Feb., 1929, W. P. Flint, G. H. Dungan, and A. L. Young.

"The Fruit Tree Leaf Roller in Western New York," Agr. Exp. Sta., Geneva, N. Y., Cir. 111, Mch. 1, 1929, S. W. Harman.

Diseases

A particularly well-illustrated and complete discussion of sweet potato diseases and their control is to be found in Technical Bulletin 99, by L. L. Harter and J. L. Weimer of the U. S. Department of Agriculture. This publication should be included in the library of every sweet potato grower.

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Autos in India

(*From page* 44)

75 per cent or more of the total population upon agriculture is too heavy to allow the necessary wage needed for a satisfactory living. Greater industrialization, as such a project offers, is quite necessary for greater national prosperity, both urban and rural.

India's economic and social status is not as satisfactory as it should be, of course. Ignorance and superstition are still keeping her people in bondage. The automobile, however, is cutting across castes and creeds. It is removing the barrier of isolation. More and better roads are being made every year. The Indian farmer is finding a wider market for his produce.

Ignorance and superstition cannot breed or long continue to exist in such an atmosphere. The motor car, bus, and truck are more than mere forms of rapid and satisfactory conveyance. They are revolutionary forces. As the automobile flourishes, the country will change. It will be a long time before the Indian people will have a motor car for every six or seven people. Nevertheless, let us watch India progress.

Agriculture Today

(*From page* 28)

years were asked to bear in mind the unfavorable returns during the three years 1922 to 1924. But the intentions-to-plant report showed an intention to increase the acreage 7 per cent over the preceding year. The warning was repeated, but the acreage was increased 9 per cent over the 1927 total, yields were unusually heavy, and the crop totaled 463,000,000 bushels—the largest potato crop ever grown. The average price of $1.04 per hundred pounds in Chicago during September, 1928, was the lowest September average in that market in 15 years.

Six years ago the Department of Agriculture began issuing outlook reports annually as an aid to farmers in adjusting their production. Simultaneously a system of reports was inaugurated, giving information as to the intentions of farmers to plant crops or to breed and feed animals.

Commercial agencies, department economists declare, often are able to supply themselves with information on supply and demand conditions affecting the prices of products handled by them, but individual farmers are unable to do so because of the complexity of the problem. Timely information of this character is regarded as essential to balanced production and orderly marketing, and helpful to both farmers and the general public.

Sugar Beets

(*From page* 21)

commonly grown on family-size farms. Its production is usually localized in the vicinity of established factories and in areas which are favorable from the standpoint of soil, temperature and rainfall. Generally the crop prefers a well-drained soil of fairly high fertility with an abundance of lime. Moderate temperatures and rainfall are necessary for best development. While the crop grows over a wide climatic range, its commercial production is confined to certain geographic areas which provide a favorable environment. Lack of rainfall is commonly corrected by irrigation, and fertilizers are frequently used to improve soil conditions. The seed used in growing the American crop is largely imported from Germany.

While the United States is not an important producer of sugar, the country is one of the leading consumers. Our sugar production is only about one-fifth of our consumption, and our net imports exceed 4,000,000 tons annually. The United States is the leading consumer of sugar and in recent years between 80 and 90 per cent of our imports came from Cuba in the form of cane sugar. It is estimated that in recent years American sugar consumption for all purposes has exceeded 114 pounds per capita—a new high record. This consumption per capita is about three times as great as it was 50 years ago. American sugar production has not changed much in the last 10 years, though the production of beet sugar has increased. Cane sugar in the United States has declined, however, so as to practically offset the increase in beet sugar. Our increased consumption has been made possible by larger imports.

Only about one-third of the world

sugar is beet sugar, most of the remainder being cane sugar. The United States, however, is not important as a producer of cane sugar, the only state where the growing of this crop is important being Louisiana, as favorable conditions are found in the lower and almost frostless delta region of the Mississippi River.

Cane sugar production is very largely a matter of tropical agriculture. Cuba is the leading producer with about 28 per cent of the world's total, followed by India, Java, Brazil, Hawaii, and Porto Rico. From the standpoint of total sugar production, the United States ranks sixth among the world's producers, Cuba first, India second, Java third, Germany fourth, and Czecho-Slovakia fifth.

Sugar and its by-products form important articles of commerce. The leading exporting nations are the tropical countries, which rank high as producers of cane sugar—Cuba leading. In addition to cane and beet sugar there are other sugars such as corn sugar, maple sugar, and others which are relatively unimportant in the world sugar trade.

The Useful Peanut

(*From page* 24)

Virginia type which are to be salted have the thick outer skin removed before being placed in the vegetable oil in which they are cooked. With salted Spanish peanuts, however, the thin red skin is left on.

Peanuts in the shell are roasted 15 minutes to an hour, depending upon the size of the roaster and the amount of heat used. Scorching is likely to result if the heating is too rapid. The machinery for roasting peanuts on a large scale is similar to that used in roasting coffee.

Within the past few years the consumption of peanuts in this country has increased by leaps and bounds. Now with the chemist providing new uses the elephants at the zoo and circus, not to mention the baseball fan, will have to be careful if they expect to get their usual supply.

Corn History

(*From page* 25)

The writer is of the opinion that the long shoe-peggy type of kernels that we commonly find in our dent or field corn is due to the gourdseed parent. Many tests have shown that these long, shoe-peggy kernels are of poor yielding ability. It is of interest to know that by inbreeding corn for several generations it is possible to obtain from dent varieties a pure flint, similar to the flint grown by our earliest settlers. On the other hand, it is not easy to get out a pure gourdseed type by inbreeding, because they are so extremely late and susceptible to disease.

All of this will show that our field corn today is in a very mixed condition and anything but pure. It is also true that this mixed condition has much to do with the yielding ability of our corn. Selection, therefore, in some cases may be of no value, as it may tend to concentrate some of the weaknesses of corn which are ordinarily covered up by its mixed or hybrid condition.

Corn quickly became the most important crop in this country. In 1609

it is stated that there were 30 acres planted. About 40 years later there were 600 bushels of corn exported and almost every year afterwards there has been an exportable surplus of corn. In 1800 there were more than 2,000,000 bushels of corn exported, showing the rapid increase in the corn acreage. In 1839 the leading corn states were Tennessee and Kentucky, and the entire crop of the United States was less than the crop in Iowa at this time. Twenty years later or in 1859 the corn growing area moved to the west and north. Illinois and Ohio became the leading corn states at this time. Ten years ago or in 1919 the corn growing area was still moving north and west. One authority states that in the 50-year period from 1849 to 1899 the center of corn production moved westward nearly 500 miles but northward only 5 miles, showing that the trend was to the west at that time.

From 1900 to the present date, the movement has been a little faster toward the north, because of the development of early varieties of corn, and the corn growing area has been spreading toward Minnesota, North and South Dakota, and Montana.

At this same time, corn was spreading over much of the old world. It did not spread with the same rapidity, however, that it did in this country and in no place did it become the dominating crop as it has here. As early as the 16th century, however, corn was being grown in practically the entire temperate and subtropical regions of the entire world.

Good Celery

(*From page* 13)

Peckham begins to set up his blanching paper. This paper is a special product manufactured for the express purpose of celery blanching. At this time it is almost impossible to walk through the celery rows. They meet and are heavy and large. Enough paper is available so that a constant supply of the finished product is ready for marketing, and as soon as one row is harvested, another row or rows are prepared. This is almost a continuous process from the 15th day of August until the end of the crop.

If freezing weather finds any papered celery, a trench is dug in the field, the location of this trench being where good drainage is available. This trench is deep enough to place the celery entirely under ground. After taking off the poor and broken stalks, the lifted plants are placed on their roots in the trench, being packed tightly enough to keep them in an upright position. Over the top of the celery, boards and soil, if necessary, are placed to prevent hard freezing. In lifting the plants a round pointed shovel is used to cut off the roots. Being an expert in this work Mr. Peckham or Mr. Rose can cut off the roots 2 inches below the ground, and it takes but a short time to lift an entire row and place the plants at one side in regular order.

In preparing the crop for marketing the plants are lifted with this shovel and trimmed reasonably in the field and the roots trimmed off to a point. The larger plants are sorted out and the second grade, if any, are placed in another pile, or in receptacles for carrying to the washroom. The celery is all washed by hand with a brush or cloth. The jumboes are tied with red tape, both top and bottom, in bunches of one dozen each. In order to tie them correctly, they are placed in a room and held tightly together by a strap which forms a loop and by foot pressure holds the celery against the upright forms into a very tight bundle. One of the tapes is then put on and the bundle is reversed and the

other tape is put on. When the strap releases the bundle the tape holds the same very tight. The outside of the dozen is trimmed with a long bladed knife so that the sides are square. The top is squared off and the entire bunch represents a finished product.

The seconds are tied in bunches of two. They are tied with tape near the roots and also near the top and wrapped in parchment paper on which the name of the farm, a good symbol, a spearhead, and Mr. Peckham's name are printed. This printing is in attractive color. The wrapper is fastened with an elastic band. Of course the washing of the seconds is similar to the first and the product is in every way as attractive as it possibly can be.

Now remains nothing but the selling. This is done by carrying to customers whom Mr. Peckham has sold to for a number of years. They are only too glad to have his celery and to pay whatever price he asks for his product. He never sells his product at the price of his neighbors. It is always higher. If his neighbors are getting $1.25 for jumboes, he is getting $1.50, etc. The bulk of his crop is of the jumbo type.

In summarizing his work in his words Mr. Peckham says, "Any man who is not willing to give the crop all he has in the way of intelligent care in planting, cultivating, fertilizing, spraying, and the many other operations, would much better let it alone and devote his time and capital to some crop where such close attention is not as essential."

"Potato" Bill Meyers

(*From page 6*)

every working of the soil must be light and shallow. Weeders 12 feet wide on which the grower rides can clean up an acre of potatoes in 25 minutes. Bill's plan is to use the weeder whenever it will take hold of the soil. Cultivators are used at other times. He knows that the object of working the soil is that of weed control. Filling in soil cracks is another object of cultivation. He harrows the fields once or twice before the plants come through the ground. When the seed is planted three to four inches below the surface of the soil, there is little danger of dragging it to the surface.

Spraying the crop with Bill is a matter of first killing the flea beetle which makes so many potato leaves look like sieves. This little black beetle is waiting for the potatoes to come up and so Bill is ready too. He puts on a 4-6-50-2 bordeaux-arsenate. There are four pounds of copper sulfate, six pounds of special spray hydrated lime, and two pounds of calcium arsenate in each fifty gallons of this spray. He puts on 100 to 150 gallons per acre with a spray pressure of not less than 300 pounds. He explains that this amount of pressure is necessary to blow the leaves over and force the liquid past the leaf hairs and onto the real surface of the underside of the leaves. It is there that Bill finds the beetles and other insects like to eat best. So Bill goes after them where they are most likely to be damaged.

The first application is made as soon as the rows are visible and he sees to it that the ground around each plant is included in the territory hit by the spray. The second spray follows as soon as the plants have made new growth. If the beetles are still active, this second spray is made seven days after the first. A third spray for the beetles may be necessary.

Bill's next trouble is to control the leafhopper. As soon as the hopper appears, usually during early August, the sprayer becomes very active. An application of 4-6-50 bordeaux is put on every seven days until the crop is

matured. During the heat of the summer Bill finds it practical to add a few pounds extra spray lime to the bordeaux. The shading effect of the spray materials is a great aid in helping the plants resist the heat. Some years the potato crop is sprayed 10 or 12 times. In no case does this number fall below eight.

Selling the crop is a real job on a potato farm like this. Protecting the potatoes from frost damage at night is another problem. He is so busy and has so many potatoes that he finds it best to pit them every night.

His machine diggers are of the type which collect the tubers in a drop bottom box. This is tripped by the driver every time it fills. The pickers then gather these bushel piles into 25-bushel piles. The yields are so even that the driver is usually able to trip his load at about the same places each time. The fields at digging time give one the impression of an Indian encampment so even and regular is the arrangement of these 25-bushel piles.

The last job at night is to cover these piles with straw. A good layer is placed on each one. In these northern muck regions frost comes early and often in the fall and this precaution is needed. As it gets colder a layer of soil is placed over the straw covered potatoes.

Bill Meyers has finished his job. He has set a record which is one worthy of any corn belt potato growers attempt to equal or better. It will be bettered some day, no doubt, but for the present his achievement makes him worthy of the title, "Indiana Potato King."

NOTES—The 3-9-18 fertilizer referred to in this article contains 3 per cent nitrogen, 9 per cent superphosphate, and 18 per cent potash.

Potassium Affects Sweet Potatoes

(*From page* 10)

quantity and quality sufficient to bring about rapid development of cambium, the tissue of the sweet potato root responsible for increasing the number of cells and therefore the thickness or chunkiness.

The "how" and "why" involved in the production of the best market grade of chunky sweet potatoes were thus approached by investigations involving field fertilizer tests, sand culture experiments under controlled conditions in the greenhouse, chemical analysis of the plants, and study of their cell structure.

Any single phase of this investigation did not permit a complete interpretation of the problem, whereas, taken together, the several methods of attack yielded results in complete accord with one another and made possible an unusually satisfactory solution of an economic and scientific research project.

Louisiana

(*From page* 18)

of sugar worth approximately $40,000,000.00.

The cane borer has not yet completely been brought under control, but experiment station workers have him on the run. The life cycle of the borer has been studied, and by planting "catch" crops such as corn near the cane, borers can be trapped and the corn fed before a crop hatches out. Lights to catch the adult moths have been used with some success; egg parasites that feed on the eggs of the borer are being use; and this tiny wasp Trichogramma the natural enemy of the borer is being increased artifically

at the experiment station and released in various cane fields. Poisoning the borer with sodium silicofluoride gave good results in some cases, but further experiments are being conducted.

However, one needs but read the report of the Bureau of Agricultural Economics to see what results have already been accomplished. The Sugar Bowl will be filled to overflowing again.

With the appointment of Dean C. T. Dowell in 1928 to succeed Dr. W. R. Dodson, many new phases of experimental work were added to the program.

"The management of an experiment station should recognize that there are two phases connected with all experiment station work," says Dr. Dowell. "One of these has to do with production and the other, we might say in a broad sense, has to do with consumption. This second phase begins in the study of human nutrition, household management, rural social conditions, and anything else affecting the life of farm people.

"It is the aim of the experiment station to develop a program that will meet all of these needs, both from the standpoint of economic production and the life of farm people. With the limited funds available, it is necessary to select for investigation those phases of farming and farm life that are thought to be most important in the state. Attempts are being made to build a program for the station that will in the end meet the major requirements of all the farming interests.

"The crop from which comes 50 per cent of the farmer's money in this state is cotton. The station started some three years ago a program of breeding cotton for the purposes of finding the varieties that will be best adapted to different sections of the cotton growing territory in Louisiana. Along with this breeding program it is necessary to carry field tests in various sections. Eight outfield tests with cotton, corn, soybeans, and oats are being carried on. Fertilizer tests are also being conducted."

Although sufficient data have not been secured upon which the station may base any specific recommendations, practically all fertilizer tests with cotton have been unusually successful. The Ouachita valley tests for 1927-28 showed that the use of 300 pounds of superphosphate, 150 pounds of nitrate of soda, and 250 pounds of kainit per acre gave a profit per acre above cost of fertilizer of $41.

Potash was the most profitable and phosphoric acid the least profitable. An application of 250 pounds of kainit when used with the other two elements gave a gain of $19.62 at a cost of $1.80 for the fertilizer; 250 pounds of nitrate of soda gave a gain of $18.21 at a cost of $6.36; 600 pounds superphosphate produced a gain of $6.03 at a cost of $4.68.

Tests on the bluff lands show that the greatest profit was made where 300 pounds of superphosphate, 250 pounds of nitrate of soda, and 100 pounds of kainit were used. On hill land results were similar to the others.

Develop Potato Industry

Eight years ago, the early Irish potato industry of South Louisiana was practically destroyed by mosaic disease. The extension division and experiment station got in touch with Northern colleges that were making a study of seed potatoes for Southern planting that could be certified to as being practically free of mosaic, spindle tuber, and numerous other diseases. Experiments were conducted at the station and in the field. Farmers saw for themselves what results could be secured by the growing of potatoes from certified stock and by proper fertilization and cultural methods. From about a carload of seed brought into Louisiana in 1921, there were last season brought in for seed purposes more than 300 cars. The industry is flourishing as never before and the potato

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crop in Louisiana is now valued in the millions.

Dean Dowell announces that a study of grades, staples, and prices of cotton is being carried on in cooperation with the United States Department of Agriculture. Further investigations in the feeding of blackstrap molasses to beef cattle and in the feeding of grain to steers while on pasture were begun last year. Investigations along the line of dairy production, having particular reference to feeding of dairy cattle, will be begun next year. One breeding project and two projects in feeding rice by-products to poultry are now under way.

Work was begun in the fall of 1928 on a study of problems in connection with human nutrition. A study of agricultural finances is being made. Dr. J. C. Miller has been employed to begin investigations next year with vegetable crops. This crop amounts to about thirty millions of dollars per year and there is much need for investigational work.

Varieties, cultural methods, and diseases of strawberries, a study of varieties of beans, and fertilizer tests on beans, cucumbers, and peppers, constitute the major program of the substation at Hammond. Plans are being made to enlarge upon the program of the rice experiment station at Crowley. A study of farm management problems will be taken up next year by R. J. Saville, now of North Carolina State College.

It is well known that the funds available for experimental work are wholly inadequate and farmers who are just beginning to realize the worth of their college are beginning to bring pressure to bear upon the legislature to deal more leniently with those whose one aim is to better farm conditions.

The Farmer Cuts His Costs

(*From page* 20)

drawn from the widespread evidence of increased farm production with less land and less labor. Machinery of course is not the only cause of declining production costs in agriculture. Improved farm management and the use of high-yielding crops and livestock hold an important place.

In regard to the post-war increase in the output of animal products per unit of feed consumed, Doctor Baker cites evidence drawn from many parts of the country. Thus in New England the number of cows decreased nearly 7 per cent between January 1, 1920, and January 1, 1925, whereas milk production increased about 4 per cent. In Wisconsin an increase of 9 per cent in the number of dairy cows was accompanied by an increase of 23 per cent in whole milk production. In Missouri an increase of only 4 per cent in the number of cows and heifers kept for milk was accompanied by an increase of 20 per cent in milk production. Milk production increased per cow even in States where total milk production declined. Agricultural production in the United States since 1922 has increased much more rapidly than the population. The farmers as a whole and not just a small minority have played their part in this gain.

Another prominent factor in agriculture's growing efficiency is commercial fertilizer, the consumption of which increases rapidly. Our pioneer regions in the use of fertilizer were the intensive truck crop areas and the cotton States. These areas still lead. More than half the commercial fertilizer purchased in the United States goes onto the farms of eight cotton-

growing States. The truck and fruit areas, though not using as much fertilizer in the aggregate as the cotton States, apply it more liberally. It is not uncommon for truck growers to put down as much as a ton per acre, whereas few cotton growers go above 500 pounds. But if the truck areas and the cotton States still show the way in fertilizer practice, they have not the lead they once had. Fertilizer sales mount in the corn belt and also in the wheat States, though the application per acre in the wheat States as yet is usually rather light.

Fertilizers Pay

Steadily the practice of restoring to the soil what the crops take from it treads upon the heels of exploitive farming, and replaces that system with one more conducive to soil maintenance and soil building. After declining in the first years of the post-war depression period, fertilizer consumption in the United States is now practically back to the peak reached in the war time boom. That peak was attained in an extraordinarily rapid ascent from 1915 to 1920. It is remarkable that the post-war depression did not prevent the previous high level in fertilizer consumption from being speedily reached again. The explanation, of course, is that fertilizer pays.

This has been demonstrated in a thousand investigations and experiments. It must suffice here to cite one example. In a study of farms in Sumter county, Georgia, the Georgia State College of Agriculture ascertained that the farms giving the largest yields of cotton per acre were those receiving the heaviest applications of fertilizer. Applications of less than 300 pounds of mixed fertilizer to the acre produced additional yields worth slightly more than the cost of the additional fertilizer. Heavier applications produced larger yields. With fertilizer at $28 a ton and cotton at 21 cents a pound, the value of the additional yields over and above the cost of the additional fertilizer used was $1 at 300 pounds of fertilizer per acre, $4.60 at 400 pounds, and $6.70 at 500 pounds.

Few of the farmers included in the survey applied more than 500 pounds of fertilizer per acre. It was consequently impossible for the investigators to determine the point at which increased applications would have ceased to be profitable. Farmers know by experience, and science has mathematically demonstrated, that returns from the use of fertilizer obey the law of diminishing returns. In other words, a point may be finally reached at which more fertilizer will not produce more crops. But the Georgia study indicated that this point was far distant in average fertilizer practice in Sumter county. Even on the farms using as much as 500 pounds to the acre, a margin for experiments with increased applications existed.

It is difficult to measure the effect of fertilizer on costs of production. Many factors modify its action. On fertile soil maintained in a good mechanical and biological condition, a given application of fertilizer may show a less conspicuous result than an equal application on soil poorer in quality and less competently handled. This may simply indicate a relatively smaller need for additional plant food on the better farm. It does not follow, however, that it has no need for additional plant food. It may be capable of utilizing more nitrogen, phosphorus, and potassium very efficiently, particularly if its soil is friable and well furnished with organic matter. The answer to the question how the use of fertilizer affects costs on the individual farm depends on the degree to which other means of soil improvement are employed, and on the skill with which the application of the fertilizer is adjusted to the pre-existing soil conditions.

Easier to answer is the question how fertilizer affects returns. Scientific investigation shows that, in general, each additional unit of fertilizer applied

causes an increase in yield which is a certain percentage of the increase caused by the preceding unit. So reliable is this principle that the Department of Agriculture makes reports of fertilizer sales in the South an important factor in its annual studies of production prospects. Wherever fertilizer results have been statistically studied, the results is the same —a demonstration that more pounds of fertilizer per tilled acre usually mean larger yields of cotton, corn, wheat, potatoes, and other crops. That more and more farmers recognize this truth must necessarily be concluded from the steadily rising curve of fertilizer consumption. Though it may not be possible to assign the exact place of fertilizer in agriculture's recently increased productivity per man and per farm, that place is unquestionably a high one.

Set for Progress

In all probability the increase in farm efficiency since the war is one of the causes of the continuing disparity between the prices of farm products and the prices of non-agricultural goods. Industry too has increased its efficiency since the war. Its progress in this respect, however, has probably not been equal to that of agriculture. This would be hard to prove, but it may be reasonably inferred from the character of the changes that have been introduced into agricultural technique during the last decade. These changes, according to Dr. O. E. Baker, have brought about a jump in production per man equal to the extraordinary jump that took place after the Civil War, when the seed drill, the mower, and the reaper first came widely into use. Industrial production, though steadily gaining in efficiency, seems not to have made an equal jump ahead.

This difference has not been statistically measured, and may on examination prove to be less important than it may at first appear. On the other hand, statistical inquiry may verify the importance here attached to it. Such gains necessarily have important effects on the relationship between agricultural and industrial policies. They mean a more rapid drop in agricultural unit costs of production than in the corresponding industrial costs. That condition tends to be accompanied by abundant or excessive farm production. But at that the saving in costs usually exceeds the decline in price.

It is not at all a question whether agriculture is more efficient than industy or vice versa. It may be impossible ever to decide that, considering the great difference that exists between the two branches of production. The question is simply whether in a given period the rate of progress in agricultural efficiency has been greater than the corresponding rate on the industrial side of the fence. When we consider the astonishing recent advances in the mechanization of agriculture, and also the statistical evidence that its output has been increased with less labor and with no corresponding increase in the area in crops, and when we reflect that agriculture probably started the post-war readjustment period from a less advanced technical point than industry, the conclusion seems inevitable that its relative progress has been more rapid.

The farmer was hard hit by the post-war depression. But it now seems as if he was hit only just hard enough to make him show the stuff of which he is made. He reacted not by throwing up his hands in despair, but by scrapping his old machinery and getting new, by scrapping his old methods and adopting better methods, and by astonishing the country with a demonstration of economy in the use of land and labor. At the same time he accepted a drastic deflation of his capital values. It would seem that he is now all set for progress.

Cabell Cooperates

(*From page 29*)

a planting plan for grounds to contain one and one-half acres. Forty young walnut trees were to be transplanted to the school grounds as soon as the planting plan had been completed.

With fifty volumes presented to the school by the Huntington Kiwanis Club and an equal number purchased by the community, the school now has a library of 100 good books.

Another outstanding example of the cooperative idea in Cabell county was some commercial fertilizer tests made on the county farm last year by the county court of Cabell county, the county agent, the West Virginia College of Agriculture, and a fertilizer company. A number of different combinations of fertilizer elements and rates of application were tried out.

A fertilizer consisting of about 3½ per cent ammonia, 12 per cent phosphoric acid, and 7 per cent potash broadcast at the rate of 1,400 pounds per acre for potatoes, led the field with a yield of 379½ bushels per acre. The same fertilizer applied at the rate of 700 pounds per acre gave 32½ bushels less yield.

Fertilizing in the row did not yield so well as broadcasting in this test.

Another test in which potash was omitted showed conclusively that this element of plant food is essential for potato production on the sandy soils around Huntington. A test with 600 pounds per acre of a 3-8-6 gave 186 bushels of potatoes, whereas only 82 bushels per acre were obtained when the 6 per cent potash was omitted. The potatoes were dug and measured under the direction of Professor D. R. Dodd from the State College of Agriculture, assisted by the three county commissioners. The information thus made available according to Professor Dodd is worth at least $50 per acre to the potato growers of this section of the state.

The bags of potatoes on the left represent the portion of the field without potash; those on the right, where potash was included. The three men standing in the center are members of the County Court, who took a keen interest in the demonstration.

English Blue Grass

(*From page 7*)

when they were sold. The steers finished good and made a rapid gain, and the fescue furnished them an abundance of palatable roughage even after frost.

From the experience of Mr. Edgerton the grass has many advantages in a pasture mixture or when planted alone for pastures, and it is expected that its use will become more general in many localities. However, as a seed crop it interferes with the standard farming scheme in central Indiana. It being a perennial it is only profitable when left in meadow for several years. In this locality it has been known to produce five consecutive annual seed crops.

From a cash standpoint it could be substituted for wheat, but it does not easily follow corn like wheat does and will not permit seeding with a legume as does wheat or oats. The market for the seed at the present time is quite sensitive to overproduction because the merits of the grass are not generally appreciated. One contemplating growing the crop for seed therefore should find an outlet for the crop. Amboy, Indiana, is headquarters for the "pool" that sells the crop for growers in this section.

White Collars

(*From page 4*)

stipends for their sweat. In this era no job is secure or no invested dollar safe without there be hidden forces delving with the pickax of the mind.

Except in dangerous occupations, the physical worker may be distracted with personal cares and fears and yet produce at his usual pace and quality. Not so with the fellow depending on originality, fluency of thought, or concentration to earn his daily bread. Home worries and a thousand and one gloom bugs get between him and his job, nettle him, and reduce his nerves to a frayed edge. Maybe we fellows who think for a living are more like race-horses and greyhounds than drafters and bulldogs, but I am not going to apologize about it.

The distinction that lies between intellectual production and tangible output can best be illustrated to my notion by taking the case of my country friend, Brown, a muscular, able, and hard-working farmer, wealthy and secure. Brown's fields are a delight to behold, well tilled and fertilized; his crops and herds are outstanding in quality. Brown's only son disappointed him considerably. The lad worked well in the fields, but took to painting and sketching. Brown's performance has made a farm that is locally famous. The son studied art finally and produced a picture that hangs in a noted gallery. His best production likewise is a field, rich in the golden haze of harvest and arched with fleecy clouds in a cool sea of blue.

The oil colors cost less than Brown's plow, and the canvas itself isn't worth a pair of overalls. Yet the finished production is a masterpiece and sold for enough to buy another farm like Brown's. About three-fourths of Brown's production came from the neck down, while ninety-nine per cent of the son's achievement came from the neck up. That's all the difference in the world sometimes.

Yet I must smile a trifle here. The world doesn't always see it that way. I know janitors who drive better cars than college professors, not because

they are so thrifty either. It often looks as though this world was made for plumbers!

My earliest gleam of the difference between goals men seek is akin to that old yarn about the two workers on the church. A ministers' conference was being held in our little town, and half a dozen of the preachers were quartered on us like the army in Flanders. One day they argued about their calling and mission. Finally one rasping old chap irritated the others and they fired the question at him, "Brother Jones, *what* are you preaching for?" Quickly he answered, "Just three hundred dollars a year." We took a dislike to him because of his mercenary stand. Probably he would have said the same on a Fifth Avenue salary.

Real intellectual workers strive more for expression and to perfect that which is imperfect than they do to count the change on Saturday night. Not so long ago an associate of mine was offered a job with thrice the salary and twice the sinecure. He rejected it for a reason that few men get credit for in these days—love of the job he had. The brisk boys would say he was in a rut, but Old John will outlive them all and be happier while doing it.

FUNNY isn't it that solid economic organization among workers succeeds best when the mass of those who are organized possess the least brains? One reason why farmers haven't stood so well in harness is because their work enables them to use *some* brain power at least; and when you get into the preacher, teacher, artist, and professional class the tie that binds is usually pretty weak and frayed out. Initiative and temperament play hob with the organization business, and so the most of us who are employed to think for someone else are not in much position to "lobby" or "log roll" for relief. Each has to face his destiny and bargain for his groceries alone.

Then, besides, we professionally trained chaps are compelled to stand the law of supply and demand like the wandering day laborer. With all the colleges beckoning to youth and all the trade schools dwindling in number, with the apprentice custom going out and the stab-at-it system coming in—what's a poor professional man to do if he is of a group not protected by state license? He is just a commodity that cannot rise above a certain dead level of supply in relation to going wage. He cannot strike because there is no union at his back, and he hopes some day that his wife may own a Spanish shawl like the butcher's frau.

FURTHERMORE, we fellows with "genius" know that half of it is sweat and the rest perspiration. The high cost of training for the "lady finger jobs" is often greater than the skill required by a train load of hunkies. Standard and working conditions in the higher brain-using crafts were set before we arrived, and it's our business to keep step and keep still. When one of us gets original and wants more pay, he at once turns into a liability instead of an asset, and the chief phones the classified-ad department.

The trouble is that we fellows with real genius are pestered by too many competitors with personality. Hitch that "personality" to a deferred-payment suit, a get-there grin, and a bundle of bluff and what chance has a talented man with more modesty than muscle? Here we find the disease at the root of the intelligentsia. We have too many imitators.

There are hundreds of colleges and universities shooting out squads of flat tires that would fit trucks better than limousines. They don't know the difference at the factory, and the users don't employ any standards to find out. It all results in an increased supply at the expense of the real article.

Intellectual work is divided thus into two groups—those protected by

laws against the untrained, and the others where the bars are down to everything that takes a notion. There are no guarantees of fitness, however, in many of the professions protected by legal barriers. There are hosts of law shops and saw-bones schools turning out fledgeling lawyers and doctors who ought to be auctioneers and veterinarians. Mediocrity is handed a juicy plum in some of our state examinations and licenses.

I fear that some of this diploma-chasing spirit may enter the other group where sheer merit and natural inclination or ability has hitherto held sway. I know a couple of agricultural college professors whom the farmers like and who have won their spurs on native ability rather than academic routine. Yet it would be regarded as heretical if I should pick out an equally able youngster fresh from the farm and suggest that he be given a chance to teach at the same institution. No, the requirements are forged tighter today and a group of quizzing done must first decide whether a candidate may graze in the same pasture with the Sacred Cows. I suppose it's the same way in engineering, magnifying the form and the letter rather than the spirit and the heart. Are we of the intelligentsia becoming Pharisees?

I SURMISE that one reason the laborer often has a grudge against the white collar gentry is that the only reason common labor exists at all is lack of machinery enough to entirely replace it. Better mechanism comes only with brains, and most of the inventions that have reduced labor expenses are the result of intangible intellect. If this keeps up long enough, some folks will either have to be intellectual or move out. The real short cuts to achievement in farm and factory get their first start by mating intelligence with imagination. The folks without either may temporarily be as flashy as a bootlegger's bride, but they live on material rather than mental satisfactions.

I ONCE lived next door to a plumber, and I was very thankful to be renting instead of owning the premises. His virtue was honesty and hard work during routine hours, and his vice was in being too dumb to appreciate a good neighbor, even though I couldn't pack a faucet.

He had a house full of gaudy luxuries and all his work meant to him was a chance to keep square and pull off his shoes at seven o'clock each evening. He had one hundred and fifteen jazz records, a ten-tube radio set, and a library consisting of one volume on the theory and practice of sewage. I guess he worried a lot over my share in contributing to social values, and he let a few driblets leak out before I packed his joint for him one day.

He wasn't interested in quality or quantity of work, and the less he did the longer the job lasted. The shorter his memory and the fewer his tools, so much the greater did his pay become. He couldn't bring home any unfinished tasks and keep his parlor looking nice. He didn't lay awake planning the fittings for next day or conjuring up a noiseless syphon. While his white collar neighbor was working on essays at midnight, he was dreaming of shorter hours and longer pay.

Yet we wouldn't need plumbers without the application of intelligence to the control of physical environment. If he had been surrounded by self-sufficing neighbors like the Indians and pioneers no labor union would have helped him in the least. Personal intelligence in the problems of living and of comfort, of health and leisure, make possible the present civilization. And who enjoys it better or would miss it more than some of the critics who indulge in diatribes at the expense of dreamers and visionaries?

Your dull bread winning critic would doubt the "practical" value of astronomy, except as a pastime. Yet astronomy has evolved out of its mathematics and calculations all the foundations of weather forecasts, the science of navigation, and the making of accurate maps. Physicists and chemists seeking the intellectual satisfaction of natural laws gave us explosives, stronger metals and bridges, the detection of food adulteration, standards of weights and measure, the manufacture of dyes and colors, and kindred things of everyday routine. Geology would be laughed off by the critic, unless he met a geologist on a hike—and then his fraternity would be firmly established. At any rate, barring the degree of dirt accumulated by the geologist in his research, he has intellectually given us mineral resources, oil wells, safer structures, and a better agriculture. Yes, even the psychologists have done us a good turn by working out a rational and humane treatment of the feeble minded—although my plumber friend might not have heard of them.

As for my own humble profession, it's chief virtue lies in contributing to intellectual curiosity. As I am both intelligent and a curiosity, that proves it.

I HAVE lived through the period when all this criticism developed. When we were youngsters the local intelligentsia consisted of the preacher, the high school principal, the county judge, and the itinerant doctor behind his gray mare and behind in everything else. The preacher was "practical" because he was handy at sewing societies and could draw lurid mental visions of harps and harpoons. Teaching had not degenerated into a feminine profession in those days, and so a little learning was tolerated in the dignified principal. Besides, he was pretty good at pitching horse-shoes. The judge and his legal staff could chew tobacco and spoil good Latin at the same time. They were mighty handy when fists couldn't secure a moral victory. The doctor's cures arose through his conversational majesty as much as through his nostrums. It was a select little circle of accepted mental aristocracy, not broken into until the passion for higher education struck the sticks.

The tide of immigration had not then set in with a rush to fill our shores with alien protest and unrest. The rapid settlement of the nation by people who fawned at titles more than intelligence, plus the hurly-burly of feeding the college mill, led us into the present state of mind.

And yet, let them rave and revile the intellectuals. While they are doing it, they are catering to our craft. Not one of them would return to barbarism—not because of the lack of native talent for the part, but because it would be mighty inconvenient.

THE nurture of the spiritual and intellectual side of life is of as much economic concern as the nurture of the body. Developed and varied human wants and new refinements of civilization constantly encourage the man who wishes to follow intellectual pursuits. He is not usually a clock watcher and a time-server. He takes pride in achievement and gets his pay in personal expression. But he sweats just as hard as the coal heaver.

What little intellectual "capital" we possess is not going to be hoarded and figured up at compound interest in measly loans, but it will be generously offered to those who can use it, as a fleeting leaf to the wastebasket or a permanent record in the scrapbook. We are neither exploiters nor profiteers, and as such *rara avis* in this era of hawks, our band of thinkers-on-small-pay justify our existence.

In other words, I wouldn't trade places with the plumber!

BE NATURAL

An American woman went to see her negro cook, who was in bed. She gave the cook's small son, Ephraim, a dollar with which to buy a chicken for his mother.

In leaving she overheard the cook say: "Gimme dat dollar, chile, an' go git dat chicken in de natchrul way." —*Tit Bits.*

Daughter: "Oh, papa, what is your birthstone?"

Father of Twelve: "My dear, I'm not sure, but I think it is a grindstone."

"Edwin, I hear the stork brought you a little baby sister."

"Aw, lay off that stork stuff! I was lookin' out the upstairs window and I seen the guy that brought it. He carried it in from his car in a little wee bit of a grip. Stork, thunder!"

"Is my face dirty or is it my imagination?"

"Your face isn't; I don't know about your imagination."—*Wisconsin Octopus.*

A TALE OF TAILS

Rastus: "Here am a telegram from de boss in Africa. He says he is sending us some lions' tails."

Circus Owner's Wife: "Lions' tails, Rastus? What are you talking about?"

Rastus: "Well, read it yourself. It say plain: 'Just captured two lions. Sending details by mail.' "

STRONG BAIT, STRONG STORY

One afternoon a Kentucky moonshiner came up to a fellow fishing, and said:

"Having any luck?"

"Mighty little," replied Sam.

"Here, put some of this on your bait," he said, pulling a bottle out of his pocket.

The worm was thrown back in the stream and very soon a great commotion was noticed. Pulling upon the line Sam discovered that the worm had a stranglehold on a big pike and was punching him in the eye with his tail.

"Sandy, I dinna like it—ya take every corner on two wheels!"

"Oo, aye, Jeanie, but dinna disturb ya-self—it cuts ma yearly tire bill about half."

Angry Motorist: "Some of you pedestrians walk along as if you owned the earth."

Irate Pedestrian: "Yes, and some of you motorists drive around as if you owned the car." (Ain't it the truth?)

SELLER AND BUYER

"Say, that guy Oscar was so lubricated last night that he sold the post office."

"Well, why so down in the mouth about it?"

"Because I bought it."

Recent Reports Prove Effectiveness of CERESAN In Controlling Smuts

ALTHOUGH Ceresan has been commercially available only since last spring, encouraging results from its use are already coming in from the field.

County Agent R. R. McFadden, in the Farm Bureau News of Harvey County, Kansas, June, 1929, reports: "Results from oat seed treatment tests conducted by Fred Grove of Emma township indicate that the old wet method of treating oats to prevent smut will probably be replaced by a dry dust method. The product used in this test was Ceresan, manufactured by the Bayer-Semesan Company of New York.

"By actual count it was found that in the untreated plots were 18% smut and the treated plot had but a very small trace of smut, a great deal less than one-half of one per cent.

"Altho counts were not made to determine the per cent of stand secured, it appeared that the stand in the treated plot was slightly better than the untreated. In the next few weeks comparative yields will be determined on these plots and the results published."

In the Pratt Daily Tribune of June 15th, Pratt County, Kansas, we find an article on the Field Day Trip conducted by County Agent F. L. Timmons which reads:

"The oat . . . plots on the Wing farm showed some striking comparisons. The untreated plot of Kanota oats showed a smut infestation of 8¼ per cent while the treated plot which was given the dry Ceresan seed treatment showed no smut infection."

Ceresan controlled stinking smut of wheat in this severe test

Advantages of Ceresan

Ceresan is effective in controlling bunt or stinking smut and seed-borne flag smut of wheat; seed-borne stem smut of rye; loose and covered smuts of oats; stripe disease of barley; covered smut of barley; kernel smuts of sorghums and millet; and seedling blight caused by seed-borne scab.

Progressive wheat farmers use Ceresan because it is convenient to handle, does not clog drills nor cause breakage of parts and can be easily and quickly applied. Seed wheat may be treated in spare time and stored without injury. Ceresan does not slow up the rate of drop and seed treated with it may be safely planted in either dry or moist soil. Any Ceresan left over may be used by the farmer next year on spring sown small grains.

Samples Furnished

Plan your seed grain treatment projects now. We will furnish gratis samples of Ceresan to those Cooperative Agricultural Extension and Vocational Agricultural Workers who will plant demonstration plots of treated and untreated checks and report to us the results of disease control and yield increases.

Send a list of crops to be treated with request for samples and descriptive literature to Bayer-Semesan Company, Inc., 105 Hudson Street, New York, N. Y.

DUBAY

CERESAN

REG. U. S. PAT. OFF.

Dust Disinfectant for Seed Grains

A TWO-CROP FERTILIZER *for* WHEAT

WHEAT fertilizer is a two-crop fertilizer because it benefits both wheat and clover hay. Plenty of fertilizer helps you make a good wheat crop and leaves enough plant food in the soil to insure a profit from your hay.

Wheat and clover grown in rotation need large quantities of potash because both are potash-loving crops. Twenty-five bushels of wheat per acre remove from the soil 24 pounds of actual potash, and two tons of clover hay remove 66 pounds of actual potash. To return to the soil all the potash these two crops remove, you require: 450 pounds per acre of a fertilizer carrying 20% potash, or 900 pounds per acre of a fertilizer carrying 10% potash, or 1500 pounds per acre of a fertilizer carrying 6% potash.

Plenty of potash in your fertilizer gives wheat the extra vigor it needs when planted after the fly-free date. Potash increases the resistance of wheat plants to winter-killing and promotes abundant stooling in early spring. Liberal applications of a well-balanced wheat fertilizer containing plenty of potash will help you make a good profit from grain and hay farming.

Top-dress Your Meadows

Top-dressing meadows or pastures in early spring with from 300 to 400 pounds per acre of a complete fertilizer carrying about 10% potash encourages clover and good grasses and drives out weeds.

Write for your free copy of our booklet "Better Grains and Hays"

Agricultural and Scientific Bureau

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